

Department of Scientific and Industrial Research.

DOMINION OBSERVATORY, WELLINGTON W.1., NEW ZEALAND.

SEISMOLOGICAL REPORTS

for

Geophysics Library

January, February, March 1935.

In this report, where the clock correction is not known, the time of P (or first phase recorded) is enclosed in a bracket.

The reports of the various stations are arranged in order of latitude, from north to south, except that of the central station at Wellington, which is given first.

For general notation, see "Modern Seismology" by G.W. Walker; also "M.N.R.A.S., Geoph. Supps." Love Waves and Raleigh Waves are designated L_q and L_r , respectively.

The term "Deep focus" is employed when the records of an earthquake show the characteristics of an abnormally deep focus. See "Proc. R. Soc., A. Vol. 132, 1931"; also "Geophysical Mag. Vol. 1, No. 4, 1928". For the methods used in determining focal depths, see "Proc. R. Soc. A. Vol. 132" also "Proc. Imp. Acad. Japan, Vol. 9, p. 497", also Dominion Observatory Bulletin 107.

Tables used: (1) For normal focus earthquakes:-

Tables by H. Jeffreys and K.E. Bullen, 1935.;

Travel-time graphs by B. Gutenberg and C.F. Richter, 1934.

(2) For deep-focus earthquakes:-

Graphs by F.J. Scrase, and tables by K. Wadati, and Masuda.

Observer: R.C. Hayes.

Director: C.E. Adams, D.Sc., F.R.A.S.

WELLINGTON (DOMINION OBSERVATORY).

Lat. 41° 17' S : Long. 174° 46' E. Height above M.S.L. = 401.5 Ft.

Lithologic Foundation : Greywacke (early Mesozoic or late Palaeozoic)

International
Seismological
Centre

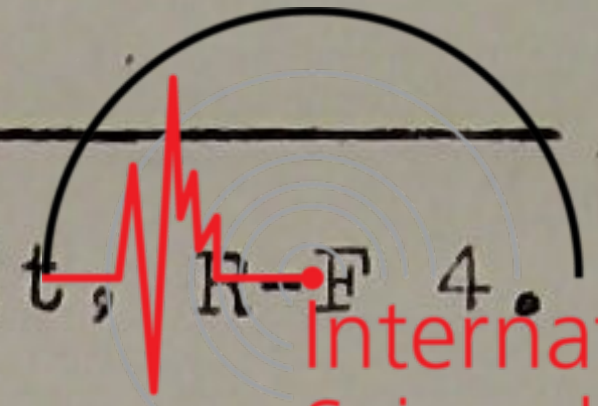
INSTRUMENTS.

Milne-Shaw Seismographs, numbers 13 and 36; magnetic damping.
 Wood-Anderson Short-period Seismograph magnetic damping.
 Galitzin-Wilip Vertical Seismograph; photo-galvanometric registration,
 magnetic damping.

CONSTANTS

| Seismograph and component | Date of Determination | Galvanometer Free Period | Pendulum Free Period | Damping ratio | $\frac{Ak}{Tl}$ |
|---------------------------|-----------------------|--------------------------|----------------------|---------------|-----------------|
| Milne-Shaw (N) | 1935 Jan. 16th | | 10.6 sec. | 20:1 | |
| Milne-Shaw (E) | " " 17th | | 9.6 " | 20:1 | |
| Wood-Anderson (N) | " " 16th | | 0.54 " | 9:1 | |
| Galitzin-Wilip (Z) | 1934 Feb. 9th | 10.6 sec. | 7.0 " | $\mu =$ | 160 |
| | | | | + .43 | |

| Date 1935 | Phase | G.M.T. h m s | Period sec. | Δ deg. | Remarks. |
|-----------|--|---|----------------|------------------|---|
| Jan. 1 | P PcP S PcS ScS sScS i | 13 26 18 28 42 30 24 32 9 36 30 38 45 41 12 | | | Felt at Apia, R-F 3-4. Epicentre 14° .8S, 175° W according to J.S.A. Focal depth 300 km. from (ScS-P). " " 310 " " (sScS-ScS). |
| 3 | i i L | 2 16 40 18 18 28 | | | |
| 4 | L | 1 45 | 20 | | |
| 4 | L | 16 0 | 25 | | |
| 4 | i L | 19 2 16 6 | 10 | | |
| 5 | L | 10 42 | 27 | | |
| 6 | e | 7 7 | 12 | | Tremors. |
| 7 | Pg Sg | 3 5 34 40 | | 0.45 | |
| 7 | | 11 53 | | | Irregular tremors: felt in East Cape region, R-F 5. |
| 7 | Pg Sg | 12 2 50 58 | | 0.65 | Felt at Picton, R-F 3. |
| 8 | | 23 2 | | | Local tremor. |
| 11 | Pg Sg | 10 17 53 58 | | 0.4 | |
| 13 | | 22 45 | | | Local tremor. |
| 14 | | 1 25 | | | " " |
| 15 | | 0 47 | | | " " |
| 15 | i | 11 33 35 | | | Traces. |



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| date 1935 | Phase | G.M.T. h m s | Period sec. | Δ deg. | Remarks |
|--------------|------------------------|--|----------------|------------------|---|
| Jan. 16 | Pg Sg | 17 25 11 16 | | 0.4 | Felt about Cook Strait, R-F 4. |
| 17 | P S iL? i | 2 13 5 17 1 18 25 25 17 | 21 12 | 23 | Riverview $\Delta=21^{\circ}.1$, Melbourne $\Delta=26^{\circ}.9$, Adelaide $\Delta=29^{\circ}.3$. Epicentre 20°S , 168°E . Deep focus? (according to Riverview and Wellington). Local tremor. |
| 17 | | 4 26 | | | " " |
| 18 | | 7 44 | | | " " |
| 18 | P | 11 44 47 | | 7.5 | Epicentre from Wellington, Hastings, New Plymouth, Christchurch, Chatham Islands, 34°S ; 176°E , Deep Doubtful. focus. |
| 20 | i iL | 0 6 50 10 22 | 18 | | |
| 22 | P S | 7 44 42 46 5 | | 7.5 | Deep focus. |
| 22 | L | 15 24 | 18 | | Shocks felt at Rotorua, R-F 4+ |
| 23 | S? L? M | 7 47 54 8 3 10 | 30 25 | 7? | |
| 25 | i i | 5 19 27 20 6 | | | Local shocks. |
| 27 | | 6 52 | | | Local shock. |
| 27 | Pg Sg | 14 52 3 8 | | 0.4 | |
| 27 | i L | 16 7 8 | 18 | | |
| 28 | eL | 8 22 | | | Traces. |
| 28 | | 15 27 | | | Local tremor. |
| 31 | Pg Sg | 5 2 1 12 | | 0.85 | |
| 31 | Pg Sg | 12 30 48 55 | | 0.5 | |
| 31 | P S | 13 52 59 53 25 | | 2.3 | Felt in southern Hawke's Bay, R-F 5. |
| 31 | P S SS L M | 17 53 0 57 28 58 37 59 58 18 2 | 10 20 16 | 25.6? | P small. Epicentre 2°S , 171°E , according to Manila. |
| Feb. 1 | e | 6 26 | | | Traces. |
| 1 | P S | 14 22 15 40 | | 2.2 | Felt at Westport, R-F 3-4. |
| 2 | | 4 32 | | | Local tremor. |
| 2 | e | 10 32 | | | Tremors. |
| 3 | e | 4 40 | | | Felt in Wairarapa, R-F 4. |



| Date 1935 | Phase | G.M.T. h m s | Period sec. | Δ deg. | Remarks. |
|--------------|---------------------|-------------------------------------|----------------|------------------|---|
| Feb. 3 | | 5 4 | | | Local shock. |
| 4 | L | 8 23 | 20 | | Traces. |
| 4 | P S SS L | 17 29 45 33 40 34 45 35 40 | 18 | 21.9 | Prolonged movements. |
| 6 | | 11 36 | | | Felt at New Plymouth, R-F 2. |
| 7 | | 7 43 | | | " " Puysegur Point, R-F 4-5. |
| 8 | e eL | 18 46 50 | 19 | | |
| 16 | P S | 6 5 12 27 | | 1.3 | |
| 17 | e | 14 29 | | | Tremors. |
| 17 | Pg Sg | 18 0 30 43 | | 1.0 | Felt about Cook Strait, R-F 4. |
| 20 | | 3 14 | | | Local tremor. |
| 21 | eL | 12 32 | | | Traces. |
| 22 | P SS? L? M | 17 29 55 44 13 50 55 | 50 27 21 | | May be Lq. |
| 23 | P S L | 3 39 30 44 6 45 31 | 10 | 26.9 | |
| 23 | L | 11 43 | 11 | | Tremors. |
| 24 | e i | 11 12 16 | 15 | | Irregular movements. |
| 27 | L | 9 41 | 20 | | Traces. |
| 27 | Pg Sg | 21 51 42 47 | | 0.4 | |
| Mar. 1 | | 5 23 | | | Tremors. |
| 1 | P S Sg? | 5 54 2 32 38 | | 2.6? | Felt at Westport, R-F 2-3; Epicentre from Wellington, Christchurch, Glenmuick, New Plymouth, 42° 0.8 S, 172° 0.0 E. |
| 3 | | 14 52 | | | Local tremor. |
| 3 | | 17 25 | | | " ", felt at Taumarunui, R-F 3. |
| 5 | | 9 28 | | | Prolonged tremors; phases not clear. |
| 6 | P S | 20 38 2 32 | | 2.6 | |
| 7 | L | 0 35 | | | Traces. |
| 7 | | 12 38 | | | Local tremor. |
| 7 | | 17 12 | | | " " |

| Date 1935 | Phase | G.M.T. h m s | Period sec. | Δ deg. | Remarks. |
|--------------|-------------------------------|--|----------------|------------------|--|
| Mar. 8 | e | 13 36 | | | Tremors. |
| 9 | P? S i | 15 13 46 14 25 48 | | 3.5? | P very small; deep focus. |
| 10 | P S | 14 16 53 17 15 | | 1.9 | Felt in north-west portion of South Island. R-F 4. |
| 10 | P S | 14 19 6 26 | | 1.7 | |
| 11 | e L | 15 8 13 | 13 | | |
| 12 | e | 13 52 | | | Traces. |
| 12 | e | 22 53 | | | " |
| 13 | Pg Sg | 13 42 41 50 | | 0.75 | |
| 13 | L | 18 55 | | | Traces. |
| 13 | | 19 35 | | | Local tremor. |
| 14 | e | 4 27 | | | Traces. |
| 14 | e? L | 11 46 49 | 17 | | Strong microseisms. |
| 14 | eL | 12 19 | | | Confused movements. |
| 14 | i L | 13 49 54 | 15 | | Regular waves. |
| 14 | eL | 15 41 | 20 | | Prolonged movements. |
| 15 | P S L i M | 11 16 36 20 45 22 24 25 | 11 | 23.5 | |
| 15 | | 17 52 | | | Local tremor. |
| 16 | e | 8 21 | | | Traces. |
| 16 | P S | 21 23 18 24 0 | | 3 | Deep focus. |
| 19 | P S | 15 13 35 57 | | 1.9 | P feeble. |
| 20 | P S | 20 28 5 27 | | 1.9 | |
| 20 | | 21 51 | | | Local tremor; felt at Collingwood, R-F 2. |
| 20 | P PP S SS L? M | 23 4 37 6 13 10 25 13 1 16 18 | 5 20 20 | 37.4 | Riverview $\Delta=27^{\circ}.4$, Melbourne $\Delta=31^{\circ}.0$, Adelaide $\Delta=32^{\circ}.4$, Epicentre near $8^{\circ}S, 158^{\circ}E$. |



| Date 1935 | Phase | G.M.T. h m s | Period secl | Δ deg. | Remarks. |
|--------------|---|---|----------------|------------------|---|
| Mar.21 | | 14 52 | | | Local tremor, felt at Danne- viøke, R-F 2. |
| 22 | P i S i | 7 7 7 9 12 28 32 | | 1.8 | |
| 23 | | 13 10 | | | Local tremor. |
| 27 | P S | 6 39 8 23 | | 1.3 | |
| 27 | | 14 29 | | | Traces of movements; records disturbed by heavy microseisms. |
| 29 | P i PcP S sS? SS? ScS sScS | 12 27 15 29 26 30 20 31 15 33 15 34 15 37 35 39 35 | | 26 | Riverview $\Delta=30^{\circ}.3$, Melbourne $\Delta=33^{\circ}.3$, Adelaide $\Delta=36^{\circ}.9$, Epi- centre near 16°S , 175°E . Focal depth 300km. from (ScS-P). " " 270 " $\frac{1}{4}$ (sScS-ScS). This may be PcS. |
| 30 | i L | 2 13 16 | | | |
| 30 | | 16 30 | | | Traces |
| 30 | L | 21 58 | 25 | | |
| 30 | L | 20 39 | 13 | | |
| 31 | e | 22 55 | 16 | | |

Note; No earthquakes were recorded at EAST CAPE during the period
1935 January 1st. to March 31st.

A R A P U N I

Lat. $38^{\circ} 5'$: Long. $175^{\circ} 39'E$. Height above M.S.L. = 212 ft.

Lithologic Foundation : Rhyolite tuffs (Pliocene), more than 300 ft
Thick, probably on Mesozoic rock.

INSTRUMENT : Milne Seismograph, E-W component; undamped.

CONSTANTS : Pendulum period=20 secs. (1935 Jan.17th); Magnification=5.6.

OBSERVER : Powerhouse Superintendent, Public Works Department, Arapuni.



| Date 1935 | Phase | G.M.T. h m s | Period sec. | Δ deg. | Remarks. |
|--------------|-----------------|-----------------------|----------------|------------------|--------------------|
| Jan. 1 | S PcS ScS | 13 30 31 30 35+ | | | |
| 17 | P S | 2 12 33 16 18 | | 20.9 | |
| 18 | | 11 4 | | | Tremors. |
| 31 | L | 17 58+ | | | |
| Feb. 4 | L | 17 33 30 | | | |
| 22 | SS? | 17 43 | | | |
| 23 | | 3 13 | | | Tremors. |
| Mar. 14 | e | 11 24 | | | |
| 20 | S | 23 10 0 | | | |
| 29 | i P? | 12 28 50 27 (0) | | | Time marks absent. |

Note; No earthquakes were recorded at TUA I during the period,
1935 January 1st. to March 31st.

NEW PLYMOUTH.

(Station A) Lat. 39° 4' S : Long. 174° 4' E. Height above M.S.L. = 112 ft.

Lithologic Foundation: Ash, agglomerate and lava at least 100 ft. thick,
on argillaceous sandstones and mudstones (Pliocene).

INSTRUMENTS: (Station A) Wood-Anderson Short-period Seismograph, magnetic damping.
(Station B) Milne-Jaggard Seismograph.

OBSERVERS: (Station A) Superintendent, The Prison, New Plymouth.
(Station B) Mr. C. E. Morshead, New Plymouth Hardware Company.

| Date 1935 | Phase | G.M.T. h m s | Period sec. | Δ deg. | Remarks. |
|--------------|---------------|-------------------------|----------------|------------------|--------------------------------|
| Jan. 14 | | 1 24 | | | Tremors. |
| 16 | Pg Sg | 2 18 (3) 8 | | 0.4 | |
| 16 | P? S? | 17 24 (42) 25 0 | | 1.6? | |
| 18 | P S | 11 4 (53) 6 8 | | 6.6 | |
| 22 | P? S | 7 43 (42) 45 1 | | 7.0? | |
| Feb. 6 | Pg Sg | 11 35 (16) 21 | | 0.4 | |
| 9 | Pg Sg | 6 38 (28) 33 | | 0.4 | |
| 11 | | 14 3 | | | Tremors. |
| 12 | | 9 23 | | | " |
| 17 | P S | 18 0 (11) 38 | | 2.4 | |
| 18 | Pg Sg | 21 17 (7) 12 | | 0.4 | |
| 28 | | 20 44 | | | Local tremor. |
| Mar. 1 | P S | 5 53 (47) 54 27 | | 3.5? | P very small. |
| 1 | | 17 1 | | | Local shock, no P waves shown. |
| 3 | P S | 17 24 (47) 25 5 | | 1.6 | |
| 5 | P? i S? | 14 14 (45) 16 0 7 | | 1.9? | Doubtful owing to microseisms. |
| 6 | P S | 20 36 (50) 37 7 | | 1.5 | |
| 9 | P S? | 15 11 (38) 12 16 | | 3.3? | |

| Date 1935 | Phase | G.M.T. h m s | Period Δ sec. deg. | Remarks. |
|--------------|----------|------------------|------------------------------|--------------------------------|
| Mar. 10 | | 14 15 | | Local shock; phases not clear. |
| 10 | | 14 18 | | Renewed movements. |
| 13 | | 8 40 | | Local tremor. |
| 13 | Pg Sg | 17 55 (27) 32 | 0.4 | |
| 20 | Pg Sg | 20 29 (9) 15 | 0.45 | |
| 22 | P S | 7 7 (52) 8 18 | 2.3 | P feeble. |
| 27 | P S? | 6 40 (30) 45 | 1.3? | Very faint record. |
| 29 | e L | 12 18 34 | | Tremors from distant shock. |

H A S T I N G S.

Lat. $39^{\circ} 38'$; Long. $176^{\circ} 53'$ E. Height above M.S.L. = 35ft.

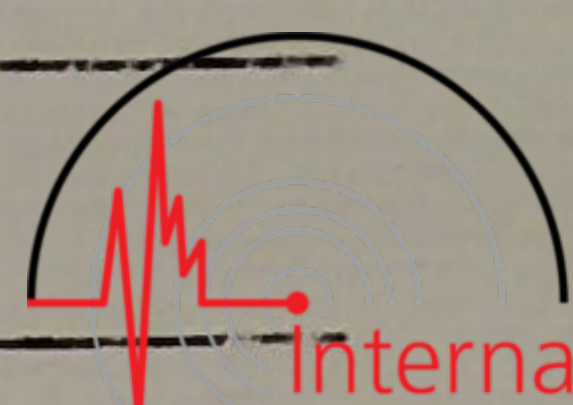
Lithologic Foundation: Alluvial sands, silts and gravels (recent Pleis-
-tocene) at least 500 ft. thick, probably on
limestone and sandstone (early Pliocene).

INSTRUMENT : Milne-Jaggard Seismograph.

OBSERVER : Mr. Henry de Denne, 304 South Nelson Street, Hastings.

| Date 1935 | Phase | G.M.T. h m s | Period Δ sec. deg. | Remarks. |
|--------------|--------|-----------------|------------------------------|--------------|
| Jan. 18 | P S | 11 6 (0) 7 3 | 5.6 | |
| 22 | | 15 33 | | Tremor. |
| 23 | | 9 58 | | " |
| 25 | | 5 20 | | " |
| 29 | | 3 21 | | " |
| Feb. 3 | | 19 55 | | " |
| 4 | | 1 40 | | " |
| 4 | | 2 52 | | Local shock. |
| Mar. 12 | | 8 53 | | " " |

Note; No earthquakes were recorded at BUNNYTHORPE during the period,
1935 January 1st, to March 31st.



T A K A K A

Lat. 40° 51' S: Long. 172° 48' E. Height above M.S.L. = 25 ft.

Lithologic Foundation : Alluvial gravels. (Pleistocene).



INSTRUMENT

Imamura Strong-motion Seismograph: three components, oil damping.

CONSTANTS

| Component | Free Pendulum period | Damping ratio | Date of determination of damping. | Magnification. |
|-----------|----------------------|---------------|-----------------------------------|----------------|
| N | 10 sec. | 3:1 | 1935 February 15th | 2 |
| E | 10 " | 3:1 | " " " | 2 |
| Z | 4 " | 1.2:1 | " " " | 2 |

Note: Values of pendulum periods and magnification as supplied by makers.

OBSERVER : Mr. W.J. Smith, Postmaster, Takaka.

| Date 1935 | Phase | G.M.T. h m s | Period sec. | Δ deg. | Remarks. |
|-----------|-------|-----------------|----------------|------------------|----------------|
| Jan. 17 | | 2 17 | | | Tremors. |
| Feb. 15 | | 17 17 | | | Local tremors. |

Note : No earthquakes were recorded at GREYMOUTH during the period, 1935 January 1st. to March 31st.

CHRISTCHURCH (MAGNETIC OBSERVATORY).

Lat. 43° 32' S : Long. 172° 37' E. Height above M.S.L. = 25ft.

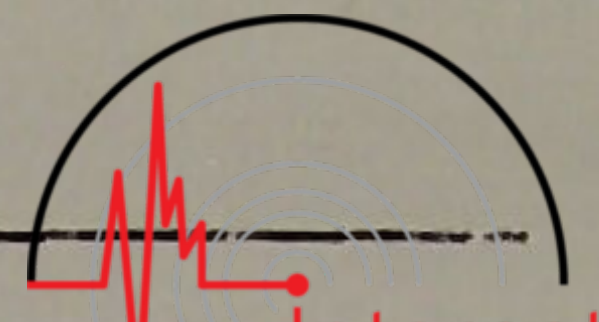
Lithologic Foundation : Gravels.

INSTRUMENT : Wood-Anderson Short-period Seismograph, magnetic damping.

CONSTANTS : (1933 Sept. 6th) Pendulum period = 0.8 sec.
Damping. = 0.85

OBSERVER : The Director, Magnetic Observatory, Christchurch.

| Date 1935. | Phase | G.M.T. h m s | Period sec. | Δ deg. | Remarks. |
|------------|--------|-----------------|----------------|------------------|------------------|
| Jan. 1 | | 13 26 | | | Distant tremors. |
| 17 | | 2 13 | | | Tremors. |
| 18 | P S | 11 5 30 7 20 | | 9.8 | |
| 20 | | 7 44 | | | Tremors. |
| 25 | | 5 19 | | | " |



| DATE 1935. | PHASE | G.M.T. | | | PERIOD sec. | Δ deg. | REMARKS. |
|---------------|----------|--------|----|-------------|----------------|------------------|--|
| | | h | m | s | | | |
| Jan. 31 | | 5 | 2 | | | | Tremor. |
| Feb. 7 | P S | 7 | 52 | 6 50 | | 3.9 | |
| 15 | P S | 5 | 31 | 59 32 11 | | 1.1 | |
| Mar. 1 | Pg Sg | 5 | 53 | 42 53 | | 0.8 | |
| 1 | | 9 | 30 | | | | Tremor. |
| 7 | | 12 | 38 | | | | Local tremor; P phases uncertain |
| 10 | | 14 | 16 | | | | Tremors. |
| 10 | | 14 | 19 | | | | " |
| 13 | | 16 | 54 | | | | Small local tremor. |
| 15 | L | 11 | 21 | | | | Distant shock. |
| 20 | | 23 | 5 | | | | " " |
| 22 | | 7 | 7 | | | | Local shock; interrupted by hour gap. |
| 29 | | 12 | 27 | | | | Distant shock. |

CHATHAM ISLANDS

Lat. $43^{\circ} 57'$: Long. $176^{\circ} 31'$ W. Height above M.S.L. = 210 ft.

Lithologic Foundation : Volcanic breccia (probably early Miocene).

INSTRUMENT : Milne Seismograph, NE-SW component, undamped.

CONSTANTS : Pendulum period=10 secs. (1935 Feb. 1st.), magnification=6

OBSERVER : The Superintendent, Radio Station, Chatham Islands.

| Date 1935. | Phase | G.M.T. | | | Period sec. | Δ deg. | Remarks. |
|---------------|------------------------|--------|----|-----------------------------------|----------------|------------------|----------|
| | | h | m | s | | | |
| Jan. 4 | | 19 | 2 | | | | Tremors. |
| 18 | P i S i L? | 11 | 4 | 54 6 24 7 9 8 36 8 24 | | 12.1 | |
| Feb. 24 | e | 11 | 14 | | | | Tremors. |

S U P P L E M E N T.

Reports from Private Stations.
-----G L E N M U I C K.

Lat. 42° 54' S. Long. 173° 7' E. Height above M.S.L. = 247 ft.

Lithologic Foundation : Gravel, on Tertiary Cretaceous and early Mesozoic rocks.

INSTRUMENT : Inverted pendulum.

OBSERVERS : Mr. C.J. Westland, F.R.A.S., and Mr. A.S. Westland.

| DATE 1935 | PHASE | G.M.T. h m s | PERIOD sec. | Δ deg. | REMARKS |
|--------------|----------|-----------------|----------------|------------------|-------------------------|
| Feb. 20 | | 23 46 | | | Very small local shock. |
| Mar. 1 | Pg Sg | 5 55 42 54 | | 0.9 | |
| 1 | Pg Sg | 9 30 9 21 | | 0.9 | |
| | | | | | R |

Department of Scientific and Industrial Research.
DOMINION OBSERVATORY, WELLINGTON W.1., NEW ZEALAND.



S E I S M O L O G I C A L R E P O R T S.

for

April, May, June, 1935.

In this report, where the clock correction is not known, the time of P (or first phase recorded) is enclosed in a bracket.

The reports of the various stations are arranged in order of latitude, from north to south, except that of the central station at Wellington, which is given first.

For general notation, see "Modern Seismology" by G.W. Walker; also "M.N.R.A.S., Geoph. Supps." Love Waves and Raleigh Waves are designated Lq and Lr, respectively.

The term "Deep focus" is employed when the records of an earthquake show the characteristics of an abnormally deep focus. See "Proc.R. Soc.; A.Vol. 132, 1931", also "Geophysical Mag. Vol. 1, No.4, 1928".

For the methods used in determining focal depths, see "Proc.R.Soc. A.Vol. 132" also "Proc.Imp.Acad. Japan, Vol.9,p. 497", also Dominion Observatory Bulletin 107.

Tables used: (1) For normal focus earthquakes:-
Tables by H. Jeffreys and K.E. Bullen, 1935.
Travel-time graphs by B. Gutenberg and C.F. Richter, 1934.
(2) For deep-focus earthquakes:-
Graphs by F.J. Scrase, and tables by K. Wadati, and
K. Masudaa

Observer: R.C. Hayes.

Director: C.E. Adams, D.Sc., F.R.A.S.

WELLINGTON (DOMINION OBSERVATORY).

Lat. 41° 17' S. ; Long. 174° 46' E. Height above M.S.L. = 401.5 ft.

Lithologic Foundation: Greywacke (early Mesozoic or late Palaeozoic)

INSTRUMENTS

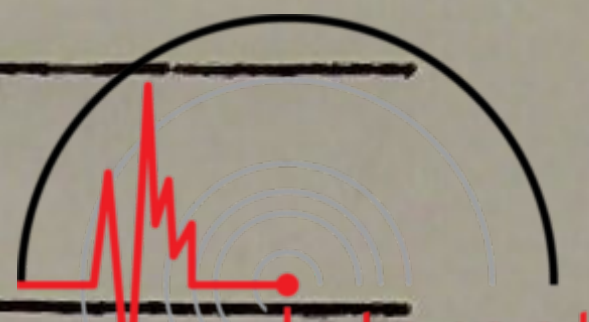
Milne-Shaw Seismographs, numbers 13 and 36; magnetic damping.
 Wood-Anderson Short-period Seismograph; magnetic damping.
 Galitzin-Wilip Vertical Seismograph; photo-galvanometric registration,
 magnetic damping.

CONSTANTS

| Seismograph and component | Date of Determination | Galvanometer Free Period | Pendulum Free period | Damping. | $\frac{Ak}{\pi}$ |
|---------------------------|-----------------------|--------------------------|----------------------|-----------|------------------|
| Milne-Shaw (N) | 1935 June 28th. | | 10.7 sec. | 20:1 | |
| Milne-Shaw (E) | " " " | | 9.8 " | 20:1 | |
| Wood-Anderson(N) | " " " | | 0.54 " | 9:1 | |
| Galitzin-Wilip(Z) | 1934 Feb. 9th. | 10.6 sec. | 7.0 " | $\mu=+43$ | 160 |

| Date 1935 | Phase | G.M.T. h m s | Period sec. | Δ deg. | Remarks. |
|-----------|--------------|-------------------|----------------|------------------|--|
| Apr. 1 | i eL | 2 26 27 | | | Prolonged movements; no marked phases. |
| 1 | e | 15 48 | | | Tremors. |
| 2 | e | 0 50 | | | Traces. |
| 2 | | 13 21 | | | Local tremor. |
| 2 | e | 16 29 | | | Tremors. |
| 2 | P S | 22 53 50 54 4 | | 1.2 | |
| 3 | | 2 5 | | | Local shock. |
| 3 | e e L? | 20 34 56 59 | | | Records disturbed by microseisms. |
| 4 | | 9 54 | | | Irregular tremors; records disturbed by microseisms. |
| 5 | e | 3 3 | | | Tremors; records disturbed by strong microseisms. |
| 5 | | 7 28 | | | Small local tremors. |
| 6 | | 17 55 | | | " " " felt in East cape region, R-F 4. |
| 6 | | 20 15 | | | Local shock. |
| 9 | | 1 47 | | | Local tremors. |
| 9 | e | 23 11 | | | Traces. |
| 10 | | 7 44 | | | Local tremors. |
| 12 | e | 3 34 | | | Traces. |
| 12 | P? S | 13 38 34 39 47 | | 6.5? | P very feeble. |
| 12 | | 18 37 | | | Local shock. |

| Date 1935 | Phase | G.M.T. h m s. | Period sec. | Δ deg. | Remarks |
|--------------|------------------------|-----------------------------------|----------------|------------------|--|
| Apr. 13 | Pg Sg | 0 20 3 7 | | 0.3 | |
| 14 | P? S | 10 44 49 45 11 | | 1.9? | P very feeble. Felt at Wanganui R-F 3. |
| 15 | | 8 3 | | | Local shock. |
| 15 | P? S | 14 28 23 38 | | 1.3? | P feeble. |
| 15 | e | 20 34 | | | Tremors. |
| 16 | Pg? Sg | 11 51 6 16 | | 0.85? | P feeble. |
| 16 | P S | 21 36 11 24 | | 1.1 | |
| 17 | | 0 19 | | | Traces. |
| 19 | PKP i L M | 15 43 24 16 8 36 50 | 30-40 21 | | |
| 19 | L | 21 57 | | | Traces. |
| 19 | | 23 33 | | | Local tremor. |
| 20 | L | 5 9 | 10 | | Traces. |
| 20 | L | 6 33 | 18 | | " |
| 20 | P S ScS sScS? | 9 37 44 39 40 49 42 53 0 | | 11 | Felt at Dannevirke, R-F 2?. Apia $\Delta=17^{\circ}.8$, New Plymouth $\Delta=9^{\circ}.4$, Christchurch $\Delta=12^{\circ}.8$ Epi- centre in vicinity of $32^{\circ}S, 177^{\circ}W$. Focal depth 350km. from (ScS-P) " " 460km. "(sScS-ScS)?" |
| 20 | | 17 21 | | | Local tremors. |
| 20 | L | 18 51 | | | Irregular tremors. |
| 20 | e L | 22 23 36 | 30 | | Prolonged movements. |
| 20 | e | 17 14 | | | Tremors. |
| 21 | | 6 52 | | | Local tremor. |
| 22 | e | 16 32 | | | Traces. |
| 23 | | 14 49 | | | Local tremor. |
| 24 | e | 1 3 | | | Traces. |
| 24 | L | 8 36 | | | " |
| 24 | | 10 58 | | | Local tremor. |
| 24 | L | 16 39 | 20 | | Traces. |
| 27 | | 19 42 | | | Local tremor. |
| 27 | | 23 52 | | | Local tremor. |

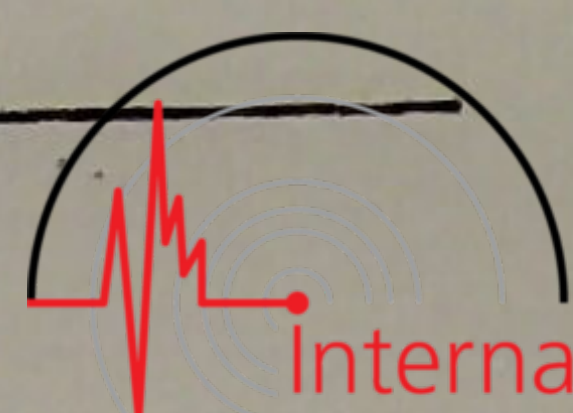


| Date 1935 | Phase | G.M.T. h m s | Period sec. | Δ deg. | Remarks. |
|--------------|-----------------------|----------------------------------|----------------|------------------|--|
| Apr. 28 | P S | 7 17 30 44 | | 1.2 | Felt at Wanganui, R-F 4-5 |
| 28 | | 14 39 | | | Feeble tremors; felt at Milford Sound. |
| May 1 | e | 8 22 | | | Traces. |
| 1 | P S | 17 36 48 59 | | 0.9 | |
| 2 | P S | 7 15 12 44 | | 2.9 | |
| 2 | P S | 20 30 10 27 | | 1.5 | Felt at Masterton, R-F 4. |
| 3 | P i S | 2 40 42 46 54 | | 1.0 | Felt at Paekakariki, R-F 4. Epicentre from Wellington, Glenmuick and Christchurch, 41°.1 S, 173°.4 E. |
| 3 | Pg Sg | 13 8 29 38 | | 0.75 | |
| 3 | P S | 18 47 47 48 24 | | 3.2? | P small. |
| 5 | Pg Sg | 8 16 30 35 | | 0.4 | Very small shock. |
| 5 | P S | 14 42 58 43 19 | | 1.8 | Felt at Farewell Spit, R-F 5. |
| 7 | | 1 34 | | | Local tremor. |
| 7 | L | 6 20 | | | Traces. |
| 8 | | 13 41 | | | Local shock. |
| 9 | | 4 24 | | | " " |
| 11 | P S | 14 48 26 46 | | 1.75 | |
| 12 | eL | 19 59 | 15 | | |
| 13 | P? S | 11 21 47 22 3 | | 1.4? | P very small. |
| 13 | P Pg? S Sg? | 11 23 10 13 25 27 | | 1.2 | Felt in southern part of North Island, R-F 3. |
| 13 | P? Pg? S Sg? | 11 30 52 56 31 7 8 | | 1.3? | P small. |
| 13 | eL | 20 35 | | | Traces. |
| 13 | i i iL M | 23 51 34 53 51 57 20 59 | 10 12 | | |

| date 1935 | Phase | G.M.T. d h m | Period sec. | Δ deg. | Remarks. |
|--------------|--|--|----------------|------------------|---|
| May 14 | P PP PPP i S ScS? PPS? i Lq Lr | 23 35 0 38 5 39 51 42 33 44 45 45 3 30 46 40 24 0 4 | | | Deep focus ? |
| 16 | P? i S | 6 6 19 22 34 | | 1.3? | P very small. |
| 16 | P? i S | 10 58 0 9 23 | | 2.0? | P very small. Felt at Dannevirke, R-F 3. |
| 16 | P? i S? i L | 20 49 28 51 15 55 54 59 15 21 1 | | 21 | |
| 18 | | 8 48 | | | Local shock; felt at Cheviot R-F 2, and at Glenmuick R-F 3. |
| 18 | | 17 55 | | | Local shock. |
| 18 | P i S | 19 15 10 16 59 17 2 | | 10.0 | Deep focus. |
| 18 | i L | 21 40 20 42 | | 20 | Records disturbed by wind. |
| 18 | | 22 54 | | | Local tremor. |
| 18 | | 23 36 | | | " " |
| 19 | e | 3 40 | | | Traces. |
| 19 | P? S | 6 22 25 44 | | 1.7? | P very small. Felt at Wanganui, R-F 4. |
| 19 | | 8 36 | | | Local tremor. |
| 20 | | 2 38 | | | Local tremor. |
| 20 | e | 5 56 | | | Traces. |
| 20 | | 11 49 | | | Local tremor. |
| 20 | | 13 27 | | | " " |
| 20 | Pg Sg | 18 54 45 57 | | 0.9 | |
| 21 | P S SS Lq Lr | 6 59 45 7 6 14 9 35 14 45 17 | | 43.7 | |
| 21 | | 7 11 | | | Local shock. |



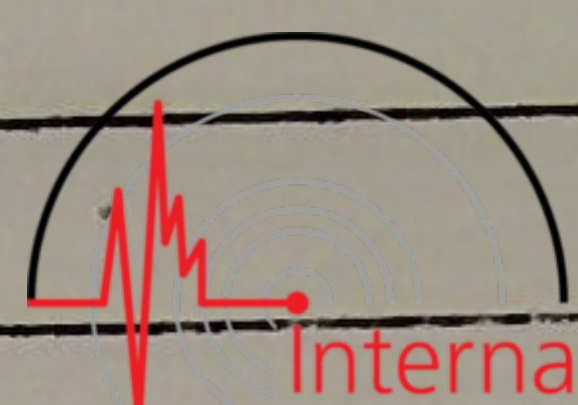
| Date 1935 | Phase | G.M.T. h m s | Period sec. | Δ deg. | Remarks. |
|--------------|--|--|---|------------------|---|
| May 21 | e L i | 12 50 53 58 50 | 10 | | |
| 22 | | 13 13 | | | Local tremor. Felt at Dannevirke R-F 2-3. |
| 22 | Pg Sg | 17 2 35 41 | | 0.45 | |
| 22 | e | 17 3 | | | Traces. |
| 22 | P S | 19 13 6 17 | | 0.9 | Felt in Wairarapa, R-F 4. |
| 23 | Pg Sg | 0 30 26 36 | | 0.8 | |
| 23 | | 20 22 | | | Local tremor. Felt at Foxton, R-F 4. |
| 24 | P PP? S ScS? i i SS SSS Lq Lr | 5 47 50 50 31 56 50 57 36 58 2 20 6 1 4 6 30 11 | 5 30 30 20 30 30 | | |
| 24 | P S | 20 18 4 19 50 | | 9 | Deep focus. |
| 25 | | 0 28 | | | Traces. |
| 25 | | 17 27 | | | " |
| 26 | eL | 22 34 | | 15 | |
| 27 | | 1 7 | | | Local tremor. |
| 27 | e? i i Lr | 3 16+ 17 15 18 40 20 | | | Very small. Shock records interrupted by tests. |
| 27 | | 7 49 | | | Prolonged local tremors. |
| 28 | P? S | 3 0 16 46 | | 2.6? | Very small. |
| 28 | | 15 41 | | | Local tremors. |
| 30 | | 13 9 | | | Traces. |
| 30 | Pg i Sg | 21 53 54 59 54 1 | | 0.5 | Felt about Cook Strait, R-F 4. |
| 30 | PKP? PKKP PPS? SS Lq Lr L | 21 54 49? 22 5 42 6 45 11 47 27 35 42 | | 40 35 20 | Confused with tail of local shock. |



| Date 1935 | Phase | G.M.T. h m s | Period sec. | A deg. | Remarks. |
|--------------|----------------------------|--|----------------|-----------|--|
| May 31 | | 10 4 | | | Local tremor. |
| 31 | P S | 10 22 59 23 15 | | 1.4 | Felt at Wanganui, R-F 3. |
| 31 | P S? | 23 29 50 30 10 | | 1.8? | |
| June 1 | | 3 9 | | | Local shock. |
| 1 | P S? | 17 6 45 7 11 | | 2.3? | Epicentre near 42°S, 172°E, according to Wellington, New Plymouth and Glenmuick. |
| 1 | | 18 17 | | | Local tremor. |
| 2 | | 11 48 | | | " " |
| 3 | | 13 27 | | | " " |
| 3 | P S | 16 38 40 57 | | 1.5 | Felt in southern part of North Island, R-F 3. |
| 7 | | 13 1 | | | Tremors. |
| 7 | P? S | 22 57 45 58 0 | | 1.3? | P small. |
| 7 | i | 23 8 0 | 12 | | Prolonged tremors. |
| 8 | | 2 3 | | | Local tremor. |
| 9 | | 23 13 | | | " " |
| 12 | | 3 13 | | | " " |
| 14 | P i i S i i | 12 35 38 45 52 56 36 0 12 | | 1.6? | Felt in parts of North Island, R-F 4-5. |
| 14 | | 13 25 | | | Local tremor. Felt in southern Hawke's Bay, R-F 4. |
| 14 | | 17 45 | | | Local tremor. |
| 15 | P S | 4 3 25 40 | | 1.3 | |
| 16 | | 6 40 | | | Tremors. |
| 17. | P? i i S | 17 20 20 32 47 54 | | 3.0? | P very small. Felt at Colling- wood, R-F 3. |
| 17 | P? S | 17 34 42 35 2 | | 2.0? | P very small. |
| 18 | i | 17 33 30 | | | Tremors. Records disturbed by microseisms. |
| 19 | | 8 3 | | | Slight local tremor. |
| 19 | e L M | 22 25 31 35 | 22 17 | | |

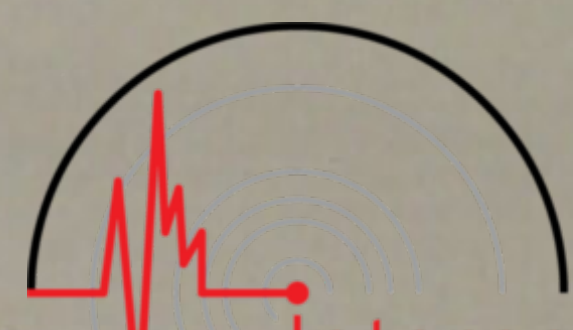


| Date 1935 | Phase | G.M.T. | | | Period sec. | Δ deg | Remarks. |
|--------------|--|--------|----|---|----------------|-----------------|--|
| | | h | m | s | | | |
| June 22 | e L M | 16 | 6 | | | | |
| | | | 18 | | 14 | | |
| | | | 23 | | | | |
| 23 | eL | 9 | 56 | | 17 | | |
| 23 | eL | 14 | 8 | | 15 | | |
| 23 | e L | 15 | 22 | | | | |
| | | | 25 | | 18 | | |
| 24 | | 2 | 34 | | | | Slight local tremor. |
| 24 | | 7 | 3 | | | | " " " |
| 24 | P S | 13 | 41 | 34 57 | | 2.0 | |
| 24 | iP pP iPP PcP i S i SS ScS sScS | 23 | 28 | 40 20 28 15 0 39 13 20 57 23 | | 30 | Az=338°; Riverview $\Delta=21^{\circ}.3$, Apia $\Delta=24^{\circ}.7$, Az=257°, Melbourne $\Delta=30^{\circ}.9$, Adelaide $\Delta=30^{\circ}.4$, Chath Islands $\Delta=34^{\circ}.9$, Manila $\Delta=54^{\circ}.0$ Epicentre near 14°S, 164°E. Focal depth 180km from (pP-P) " " 110 " " (ScS-P) " " 190 " " (sScS-ScS) |
| 25 | | 7 | 35 | | | | Traces. |
| 25 | L | 13 | 18 | | | | " |
| 25 | | 16 | 25 | | | | Local tremors. |
| 27 | P S | 4 | 11 | 16 38 | | 1.9 | |
| 28 | e | 2 | 38 | | | | Traces. |
| 29 | i eL M | 8 | 13 | 0 37 42 | | 18 16 | |
| 29 | | 8 | 43 | | | | Local shock. |
| 29 | eL | 18 | 48 | | | | |



International
Seismological
Centre

Note; No earthquakes were recorded at EAST CAPE during the period
1935 April 1st. to June 30th.

ARAPUNIInternational
Seismological
Centre

Lat. $38^{\circ} 5' S$: Long. $175^{\circ} 39' E$. Height above M.S.L. = 212 ft.

Lithologic Foundation: Rhyolite tuffs (Pliocene), more than 300 ft. thick, probably on Mesozoic rock.

INSTRUMENT : Milne Seismograph, E-W component; undamped.

CONSTANTS : Pendulum Period=22 secs. (1935 June 4th); Magnification 5.6

OBSERVER : Powerhouse Superintendent, Public Works Department, Arapuni.

| Date 1935 | Phase | G.M.T. h m s | Period sec. | Δ deg. | Remarks. |
|--------------|------------------------|-----------------------------------|----------------|------------------|---------------------------------|
| Apr. 1 | e | 2 26 | | | Tremors. |
| 4 | e | 9 52 36 | | | |
| 5 | e | 3 3 | | | |
| May 24 | ScS? i SS L | 5 57(36) 58 18 6 1 36 7+ | | | No time marks. |
| 27 | | 3 30 | | | Tremors. |
| 30 | e L | 22 5 41 | | | |
| Jun. 19 | | 22 30 | | | Tremors. |
| 22 | eL | 16 20 | | | |
| 24 | P? iS? isS? M | 23 28 12 32 45 33 30 34+ | | 28? | P very small. This may be SP |

Note : No earthquakes were recorded at TUAI during the period
1935 April 1st to June 30th.

NEW PLYMOUTH.

(Station A) Lat. $39^{\circ} 4' S$: Long. $174^{\circ} 4' E$. Height above M.S.L.=112 ft.

Lithologic Foundation: Ash, agglomerate and lava at least 100 ft. thick, on argillaceous sandstones and mudstones (Pliocene).

INSTRUMENTS: (Station A) Wood-Anderson Short-period Seismograph.
Magnetic damping.

(Station B) Milne-Jaggard Seismograph.

OBSERS : (Station A) Superintendent, The Prison, New Plymouth.
(Station B) Mr.C.E.Morshead, New Plymouth Hardware Company.

| Date 1935 | Phase | G.M.T. h m s | Period sec. | Δ deg. | Remarks. |
|--------------|-------|-----------------|----------------|------------------|----------|
| Apr. 9 | | 1 47 | | | Tremors. |
| 11 | | 0 + | | | " |



| Date 1935 | Phase | G.M.T. h m s | Period sec. | Δ deg. | Remarks. |
|--------------|--------------|-----------------------|----------------|------------------|---|
| Apr. 12 | P S | 13 37(12) 38 27 | | 6.6 | |
| 15 | P S | 14 28 (6) 38 | | 2.8 | |
| 16 | Pg Sg | 11 35(24) 30 | | 0.45 | |
| 16 | | 11 51 | | | Tremors. |
| 16 | | 21 36 | | | " |
| 20 | P S | 9 37 (0) 38 45 | | 9.4 | |
| 28 | P S | 7 17(23) 41 | | 1.6 | |
| May 3 | P S | 13 8 28 45 | | 1.5 | |
| 3 | P S | 18 47 (5) 24 | | 1.7 | |
| 11 | P? S | 14 48(53) 49 12 | | 1.7? | P very small. |
| 13 | | 11 22 | | | Local shock confused with micro- seisms. |
| 13 | P S | 11 23(22) 24 41 | | 7.0? | |
| 16 | P S | 10 59(28) 56 | | 2.5 | |
| 19 | | 6 22 | | | Local shock. |
| 30 | | 21 52 | | | " " , faint record. |
| 31 | | 10 21 | | | " " " " |
| June 1 | P? S? | 17 6 (7) 45 | | 3.3? | Phases not clear. |
| 3 | P? S? | 16 38(55) 39 14 | | 1.7? | Phases not clear. |
| 14 | P i S? | 12 37(16) 21 47 | | 2.7? | |

H A S T I N G S

Lat. 39° 38' S: Long. 176° 53' E. Height above M.S.L. = 35 Ft.

Lithologic Foundation: Alluvial sands, silts and gravels (recent Pleistocene) at least 500ft. thick, probably on limestone and sandstone (early Pliocene).

INSTRUMENT: Milne-Jaggard Seismograph.

OBSERVER: Mr. Henry de Denne, 304 South Nelson Street, Hastings.

| Date 1935 | Phase | G.M.T. h m s | Period sec. | Δ deg. | Remarks. |
|--------------|---------------|---------------------|----------------|------------------|---------------|
| May 15 | | 15 3 | | | Local shock. |
| 15 | | 15 54 | | | " " |
| 16 | | 10 58 | | | " " |
| 18 | P S | 19 16 (0) 17 30 | | 8.0 | Deep focus. |
| 20 | | 15 15 | | | Local tremor. |
| June 12 | Pg Sg i | 3 15 (0) 3 13 | | 0.25 | |



Note: No earth quakes were recorded at STRATFORD, BUNNYTHORPE,
TAKAKA, and GREYMOUTH, during the period 1935 April 1st
to June 30th.

CHRISTCHURCH (MAGNETIC OBSERVATORY)

Lat. $43^{\circ} 32'$ S: Long. $172^{\circ} 37'$ E. Height above M.S.L. = 25ft.

Lithological Foundation = Gravels.

INSTRUMENT: Wood-Anderson Short-period Seismograph; magnetic damping.

CONSTANTS : (1933 Sept. 6th) Pendulum free period = 0.8 secs.
Damping = 0.85

OBSERVER: The Director, Magnetic Observatory, Christchurch.

| Date 1935 | Phase | G.M.T. h m s | Period sec. | Δ deg. | Remarks. |
|--------------|-------------|-------------------------------|----------------|------------------|--|
| Apr. 2 | P i S | 5 5 0 ⁺ 7 26 | | 2.3? | P in minute gap. |
| 8 | Pg Sg | 15 25 25 30 | | 0.4 | |
| 12 | | 13 40 | | | Tremors. |
| 14. | | 10 15 | | | Local tremor. |
| 15. | | 8 3 | | | " " |
| 15 | P? S? | 14 28 30 ⁺ 29 6 | | | P in minute gap; phases very doubtful. |
| 16 | | 11 50 | | | Tremors. |
| 16 | | 21 35 | | | " |
| 17 | Pg Sg | 17 53 40 52 | | 0.9 | |
| 20 | P S | 9 38 16 40 38 | | 12.8 | |
| 27 | | 23 50 | | | Tremors. |

| Date 1935 | Phase | G.M.T. h m s | Period sec. | Δ deg | Remarks. |
|--------------|--------|-------------------|----------------|-----------------|---|
| Apr. 28 | | 5 27 | | | Tremors. |
| May 2 | | 7 15 | | | " |
| 3 | P S | 2 40 55? 41 23 | | 2.5? | P very feeble. |
| 24 | | 20 20 | | | From May 11th to 18th no records owing to repairs to driving clock. Tremors. |
| 28 | | 3 0 | | | " |
| June 24 | | 23 29 | | | Tremors from distant shock. |
| 27 | | 4 10 | | | Local shock. |



CHATHAM ISLANDS.

Lat. $43^{\circ} 57'$: Long. $176^{\circ} 31'$ W. Height above M.S.L. = 210 ft.

Lithologic Foundation : Volcanic breccia (probably early Miocene).

INSTRUMENT: Milne Seismograph, NE-SW component; undamped.

CONSTANTS: Pendulum Period = 10 secs. (1935 June 7th) Magnification 6.

OBSERVER: Superintendent, Radio Station Chatham Islands.

| Date 1935 | Phase | G.M.T. h m s | Period sec. | Δ deg. | Remarks. |
|--------------|------------------|--------------------------------|----------------|------------------|----------|
| June 24 | P S L M | 23 29 30 35 0 38 + 42 | | 34.9 | |
| 29 | | 18 47 | | | Tremors. |

S U P P L E M E N T

Reports from Private Stations

GLENMUICK.

Lat. $42^{\circ} 54'$ S: Long. $173^{\circ} 7'$ E. Height above M.S.L. = 247 ft.

Lithologic Foundation : Gravel on Tertiary Cretaceous and early Mesozoic rocks.

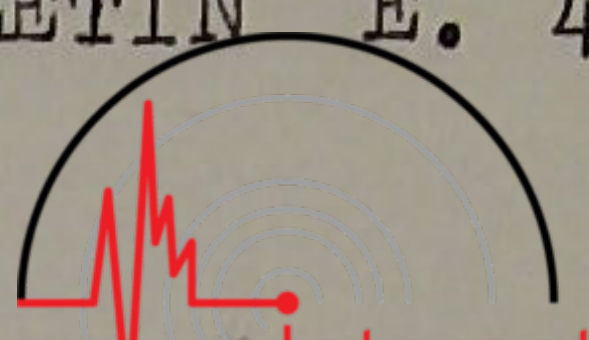
INSTRUMENT: Inverted pendulum.

OBSERVERS: Mr. C.J. Westland, F.R.A.S., and Mr. A.S., Westland.

| Date 1935 | Phase | G.M.T. h m s | Period sec. | Δ deg | Remarks. |
|--------------|------------------|-----------------------------|----------------|-----------------|----------|
| May 3 | P e S e | 2 45 51 46 8 12 17 | | 1.8 | |

| Date 1935 | Phase | G.M.T. | | | Period sec. | Δ deg. | Remarks. |
|--------------|------------|--------|----|----------|----------------|------------------|---------------------|
| | | h | m | s | | | |
| May 18 | Pg Sg | 8 | 48 | 15 21 | | 0.45 | Felt locally R-F 3. |
| 18 | | 19 | 19 | | | | Small movements. |
| 30 | | 21 | 53 | | | | Small local shock. |
| June 1 | P S | 17 | 16 | 52 6 | | 1.2 | |
| 18 | Pg? Sg? | 12 | 40 | 31 35 | | 0.3? | |
| 25 | Pg? Sg? | 15 | 25 | 42 48 | | 0.45? | |





DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH.

DOMINION OBSERVATORY.WELLINGTON, W.I.,
NEW ZEALAND.

S E I S M O L O G I C A L R E P O R T S .

for

JULY, AUGUST, SEPTEMBER, 1935.

In this report, where the clock correction is not known, the time of P (or first phase recorded), is enclosed in a bracket.

The reports of the various stations are arranged in order of latitude from north to south, except that of the central station at Wellington, which is given first.

For general rotation, see "Modern Seismology", by G.W. Walker; also M.N.R.A.S. "Geoph. Supps." Love waves and Raleigh waves are designated L_q and L_r , respectively.

The term "Deep Focus" is used when the records of an earthquake show the characteristics of an abnormally deep focus. See "Proc. R. Soc. A. Vol. 132, 1931"; also "Geophysical Mag. Vol 1, No. 4, 1928".

For methods employed in determining focal depths, see "Proc. R. Soc. A. Vol. 132, 1931"; also "Proc. Imp. Acad. (Japan) Vol 9, p. 497". A paper has been published dealing with a new phase $sScS$, which has been discovered on deep focus earthquake records of this observatory; and a consequent method of determining focal depth. (See "Dominion Observatory Bulletin 107").

Tables used : (1) for normal focus earthquakes :

Tables by H. Jeffreys and K.E. Bullen, 1935,
and
Travel-time graphs by B. Gutenberg and C.F.
Richter, 1934.

(2) for deep-focus earthquakes :

Graphs by F.J. Scrase; and tables by K. Wadati and
K. Masuda.

G.W. Walker, also M.N.R.A.S. "Geoph. Supps." Love waves and
Raleigh waves are designated L_q and L_r , respectively.

Observer : R.C. Hayes.

Director : C.E. Adams, D.Sc.,
F.R.A.S.

The term "Deep Focus" is used when the records of an
earthquake show the characteristics of an abnormally deep
focus. See "Proc. R. Soc. A. Vol. 132, 1931"; also
"Geophysical Mag. Vol 1, No. 4, 1928".

For methods employed in determining focal depths,
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Acad. (Japan) Vol 9, p. 497". A paper has been published
dealing with a new phase $sScS$, which has been discovered on
deep focus earthquake records of this observatory; and a
consequent method of determining focal depth. (See "Dominion
Observatory Bulletin 107").

WELLINGTON (DOMINION OBSERVATORY)

Lat. $41^{\circ} 17' S$: Long. $174^{\circ} 46' E$. Height above M.S.L. = 401.5 ft.

Lithologic Foundation : Greywacke (early Mesozoic or late Palaeozoic).

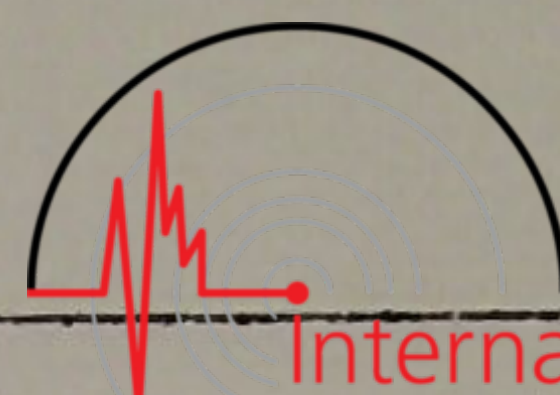
INSTRUMENTS.

Milne-Shaw Seismographs numbers 13 and 36, magnetic damping.
 Wood-Anderson Short-period Seismograph, magnetic damping.
 Galitzin-Wilip Vertical Seismograph, photo-galvanometric registration, magnetic damping.

CONSTANTS.

| Seismograph and component | Date of Determination | Galvanometer Free Period | Pendulum Free Period | Damping Ratio | Ak L |
|---------------------------|-----------------------|--------------------------|----------------------|---------------|------|
| Milne-Shaw (N) | 1935 August 14th | | 10.5 sec | 20 : 1 | |
| Milne-Shaw (E) | " " " 15th | | 9.9 " | 20 : 1 | |
| Wood-Anderson (N) | " " " 14th | | 0.41" | 9.5 : 1 | |
| Galitzin-Wilip (Z) | 1934 Feb. 9th. | 10.6 sec. | 7.0 " | = | 160 |
| | | | | +0.43 | |

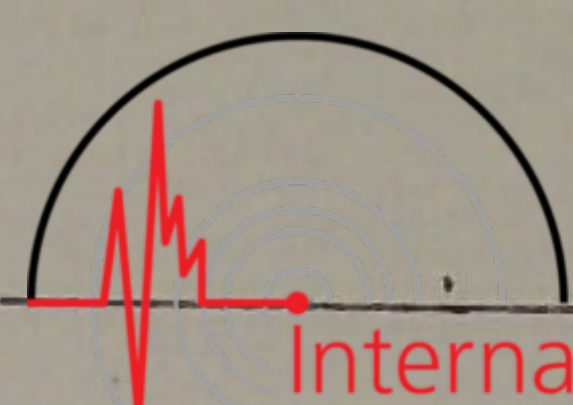
| DATE 1935 | PHASE | G.M.T. h m s | PERIOD sec | Δ deg. | REMARKS. |
|--------------|----------------|----------------------|---------------|------------------|--------------------------------------|
| July 2 | | 12 5 | | | Local tremor |
| 3 | P g Sg i | 8 21 15 20 24 | | 0.4 | Felt in and around Wellington R-F 3. |
| 3 | P? i S | 10 20 40 47 55 | | 1.3? | P very small. |
| 3 | | 18 25 | | | Local tremor |
| 3 | P S | 18 51 7 28 | | 1.8 | |
| 5 | | 22 24 | | | Local tremor. |
| 6 | | 3 41 | | | " " " |
| 11 | e | 7 25 | | | Traces. |
| 11 | e L M | 13 19 23 25 | 15 15 | | |
| 13 | Pg Sg | 0 35 8 19 | | 0.8 | |
| 13 | Pg Sg | 0 44 34 45 | | 0.8 | |
| 14 | | 7 59 | | | Local shock |



| DATE 1935 | PHASE | G.M.T. h. m s | PERIOD sec | Δ deg | REMARKS |
|--------------|---------------------------------|--|---------------|-----------------|---|
| July 15 | P i i i S i i | 12 0 8 17 25 32 40 48 1 2 | | 2.8 | Felt at many places in the North Island, max. R-F 7 near Taupo. Epicentre 38.7 S, 172 E. (from Wellington, Arapuni, Tuai, Hastings, New Plymouth, Glenmuick, Christchurch). |
| 15 | | 12 22 | | | Tremors. |
| 15 | | 12 38 | | | Tremors. |
| 15 | P ScS sScS | 14 20 52 27 50 31 51 | | | Focal depth 570 km. (sScS-ScS). Largest amplitude on E-W compt. |
| 15 | | 21 3 | | | Local shock |
| 16 | | 1 22 | | | " " " |
| 16 | | 11 47 | | | " " " |
| 16 | P S | 12 37 10 34 | | 2.1 | Felt at Westport, R-F 4. |
| 16 | P S | 13 23 2 26 | | 2.1 | Felt at Nelson and Westport, max. R-F 5. |
| 17 | e | 1 12 | | | Traces. |
| 17 | P S | 6 15 37 16 15 | | 3.3 | Felt between Lake Taupo and New Plymouth, max. R-f4. Epicentre in vicinity of 38.4 S, 176.2 E. (from Wellington, Hastings, New Plymouth.) |
| 17 | P S L M | 10 58 9 11 8 7 26 29 | 19 | | |
| 18 | P S | 6 35 40 36 15 | | 3.1 | Felt between Hawke's Bay and East Cape, max. R-F 5. |
| 18 | P? S | 6 57 3 33 | | 2.6? | P indistinct, Felt at Motu, R-F 3. |
| 18 | | 9 10 | | | Local tremor. |
| 19 | P PP S SS L M | 1 2 15 5 27 12 30 17 45 28 30 | 28 | | |
| 20 | | 3 13 | | | Local Tremor. |
| 21 | | 10 2 | | | " " " |
| 22 | | 3 20 | | | " " " |

| DATE 1935 | PHASE | G.M.T. | | | PERIOD sec. | △ deg. | REMARKS |
|--------------|--|--------|----|----|----------------|-----------|---|
| | | h | m | s | | | |
| July 24 | P? S L | 3 | 30 | 0? | | 17.3? | P very faint |
| | | | 33 | 10 | | | |
| | | | 34 | 30 | 25 | | |
| 24 | P S L | 3 | 56 | 58 | | 17.7 | |
| | | 4 | 0 | 12 | | | |
| | | | 1 | 10 | 23 | | |
| 25 | Pg Sg | 14 | 12 | 24 | | 0.5 | |
| | | | | 30 | | | |
| 26 | | 0 | 59 | | | | Local tremor. |
| 27 | | 1 | 3 | | | | " " " , felt near Cape Campbell, R-F 4. |
| 27 | | 4 | 21 | | | | Local tremor, Felt near Cape Campbell, R-F 4. |
| 29 | Pg. Sg | 1 | 19 | 57 | | 0.6 | |
| | | | 20 | 5 | | | |
| 29 | P i i S PcP i ScS sScS? | 7 | 43 | 0 | | 19 | Az=25°-30° Epicentre in vicinity of 22 S, 175 W. (from Wellington, Apia, Arapuni, Hastings, New Ply- mouth, Christchurch, Chatham Islands). Focal depth 470 km (ScS-P) " " " 500? km (sScS-ScS) |
| | | | 45 | 7 | | | |
| | | | | 30 | | | |
| | | | 46 | 17 | | | |
| | | | 47 | 12 | | | |
| | | | 48 | 4 | | | |
| | | | 53 | 28 | | | |
| | | | 57 | 0 | | | |
| 29 | | 21 | 32 | | | | Local Tremor. |
| 29 | L | 22 | 20 | | 17 | | |
| 30 | Pg Sg | 4 | 54 | 26 | | 0.8 | |
| | | | | 36 | | | |
| 30 | P S | 5 | 29 | 52 | | 2.2 | |
| | | | | 17 | | | |
| 30 | eL M | 6 | 8 | | | | |
| | | | 24 | | 15 | | |
| 30 | eL | 11 | 37 | | 15 | | |
| 31 | | 5 | 2 | | | | Local tremor. |
| 31 | P? S | 9 | 20 | 29 | | 2.1 | P very small. |
| | | | | 53 | | | |
| 31 | e L | 10 | 12 | | | | |
| | | | 14 | | 17 | | |
| 31 | | 12 | 18 | | | | Local tremor. |
| 31 | | 13 | 24 | | | | " " " |
| 31 | e eL | 18 | 50 | | | | |
| | | | 55 | | | | |
| Aug. 1 | e | 14 | 26 | | | | Prolonged tremors. |
| 3 | | 0 | 1 | | | | Local tremor; felt near Cape Campbell, R-F 4. |

| DATE 1935 | PHASE | G.M.T. | | | PERIOD sec. | △ deg | REMARKS |
|--------------|-------|--------|----|----|----------------|----------|---------------------------------|
| | | h. | m. | s | | | |
| Aug. 3 | eP | 1 | 22 | 37 | 5 | | May be SKS |
| | S? | | 32 | 50 | | | |
| | ScS | | 33 | 20 | | | |
| | SS | | 38 | 14 | | | |
| | Lq | | 45 | 20 | 30 | | |
| | Lr | | 54 | | 30 | | |
| | L | | 56 | | 25 | | |
| | M | | 58 | | 22 | | |
| 3 | | 9 | 44 | | | | Local tremor |
| 4 | | 10 | 26 | | | | " " " , felt at Wangānui R-F 3. |
| 5 | e | 13 | 50 | | | | Tremors |
| 6 | e | 0 | 29 | | | | Traces. |
| 6 | | 2 | 55 | | | | Local tremor. |
| 6 | e | 13 | 4 | 21 | | | |
| | i | | 8 | | | | |
| 6 | e | 16 | 33 | | | | |
| 6 | | 20 | 28 | | | | Local tremor. |
| 7 | e | 2 | 42 | | | | Traces |
| 7 | | 2 | 58 | | | | Local tremor. |
| 10 | P | 5 | 26 | 44 | 2.1 | | Felt at Kahurangi Point, |
| | S | | 27 | 8 | | | R-F 4. |
| 10 | e | 17 | 51 | | | | Prolonged. |
| | L | 18 | 7 | | | | |
| 10 | P | 23 | 34 | 52 | 1.2 | | Felt in southern part of |
| | i | | 35 | 5 | | | North Island, R-F 3. |
| | S | | | 6 | | | |
| 11 | P | 0 | 8 | 40 | 3.0 | | |
| | S | | 9 | 14 | | | |
| 11 | eL | 18 | 3 | | | | Traces. |
| 12 | eL | 3 | 29 | | | | " " |
| 12 | | 4 | 51 | | | | Local tremor. |
| 13 | P | 0 | 18 | 5 | 4.2 | | Felt in East Cape Peninsula, |
| | S | | | 53 | | | Deep Focus. R-F 6. |
| 13 | | 15 | 39 | | | | Local shock. |
| 13 | P | 15 | 48 | 6 | 1.3. | | Felt in western areas from |
| | S | | | 21 | | | Awakino in the North Island |
| | | | | | | | to Collingwood and Nelson in |
| | | | | | | | the South Island; max. R-F 4. |
| | | | | | | | Epicentre 40.4.S, 173.5 E |
| | | | | | | | (from Wellington, Stratford, |
| | | | | | | | Christchurch) |
| 16 | P? | 15 | 40 | 3 | 10.2? | | P very indistinct. |
| | S | | 41 | 58 | | | Deep focus |



| DATE 1935 | PHASE | G.M.T. | | | PERIOD sec | deg | REMARKS |
|--------------|-------|--------|----|----|------------------------|----------------------------|---|
| | | h. | m | s | | | |
| Aug. 17 | P | 1 | 49 | 0 | | 21.6 | Reported felt at Norfolk Is. Apia $\Delta=21^{\circ}.5$, Riverview $\Delta=21^{\circ}.3$, Chatham Islands $\Delta=26^{\circ}.0$, Melbourne $\Delta=28^{\circ}.3$, Adelaide $\Delta=29^{\circ}.3$ Epicentre near 21 S, 168 E. |
| | pP? | | | 14 | | | |
| | PP? | | | 29 | | | |
| | i | | | 43 | | | |
| | S | | 52 | 50 | 10. | | |
| | sS? | | 53 | 10 | | | |
| | PcP? | | | 21 | | | |
| Lq? | | 54 | | 21 | May be SS. | | |
| Lr | | 55 | | | | | |
| M | | 56 | | 18 | Very Large amplitudes. | | |
| 17 | | 2 | 55 | | | Local tremor. | |
| 19 | | 12 | 51 | | | " " " | |
| 19 | i | 13 | 55 | | | Small irregular movements. | |
| | i | | 58 | 50 | | | |
| | e | 14 | 3 | | | | |
| 21 | P | 6 | 6 | 12 | | 2.0 | |
| | S | | | 35 | | | |
| 22 | P? | 6 | 36 | 23 | | | P very uncertain. |
| | S | | | 36 | | | |
| 22 | | 23 | 8 | | | | Local tremors. |
| 23 | eL | 10 | 38 | | | | |
| 23 | e | 14 | 28 | | | 25 20 | |
| | eL | | 35 | | | | |
| | M | | 39 | | | | |
| 25 | eL | 20 | 48 | | | | Irregular movements. |
| 26 | e | 12 | 34 | | | | Tremors. |
| 27 | | 1 | 28 | | | | Local tremor. |
| 27 | Pg | 3 | 13 | 25 | | 0.4 | |
| | Sg | | | 30 | | | |
| 28 | Pg | 4 | 50 | 0 | | 1.0 | |
| | Sg | | | 13 | | | |
| 29 | | 11 | 27 | | | | Local tremor. |
| 30 | P? | 3 | 11 | 30 | | 13 | Deep focus |
| | S | | 13 | 51 | | | |
| 30 | | 4 | 17 | | | | Local tremors. |
| 30 | e | 18 | 24 | | | | Traces. |
| 31 | | 0 | 57 | | | | Local Tremor. |
| 31 | P? | 6 | 56 | 38 | | 2.0? | Phases not clear. Felt at Westport, , R-F 3-4. |
| | S | | 57 | 1 | | | |
| 31 | | 15 | 23 | | | | Local shock |

| DATE 1935 | | PHASE | C.M.T. h. m. s | PERIOD sec. | Δ deg. | REMARKS |
|--------------|----|--|---|----------------|------------------|---|
| Sept. | 1 | | 3 58 | | | Local Shock. |
| | 1 | | 10 10 | | | " " " |
| | 1 | P S | 10 56 37 55 | | 1.6 | Felt about Cook Strait and in Northern parts of South Is. R-F 6? Epicentre near 41.6 S, 172.7 E (from Wellington, Christchurch, New Plymouth). Local tremor. |
| | 2 | | 4 57 | | | Local tremor. |
| | 2 | e | 7 30 | | | Prolonged tremors. |
| | 3 | P S | 17 36 10 37 | | 2.4 | |
| | 4 | P S? Lr? | 1 49 46 59 10 2 11 | 30 | | |
| | 6 | | 9.20 | | | Local tremors. |
| | 9 | P S ScS SS Lq Lr? | 6 27 15 35 3 36 58 38 30 41 34 46 | 40 20 | | |
| | 9 | | 19 25 | | | Local tremor, felt at Collingwood R-F 4. |
| | 10 | e | 11 21 | | | Tremors; strong microseisms |
| | 10 | | 19 53 | | | Local tremor. |
| | 11 | P PL S Lr? PcP i PcS? ScS? | 11 50 25 51 21 52 8 53 3 55 19 56 5 58 54 12 2 41 | 18 | 10.5 | Apia $\Delta=18^{\circ}.3?$, Riverview $\Delta=29^{\circ}$, Manila $\Delta=74^{\circ}$. Epicentre near 31 S, 176 W. May be SS. Focal depth 340 km? (ScS-P) |
| | 11 | P i S ScS PcPPcS i SS i SSS Lq Lr M | 14 16 59 17 4 27 8 33 28 5 29 45 33 29 35 15 37 6 40 45 49 | 30 30 22 | | |
| | 12 | eL | 9 28 | | | Tremors. |
| | 13 | L | 10 30 | 30 | | Long series of regular waves lasting about 3 hours, on N-S component only. Possibly not seismic |



| DATE 1935 | PHASE | G.M.T. | | | PERIOD sec. | △ Deg. | REMARKS |
|--------------|----------|--------|----|----|----------------|--|---------|
| | | h | m | s | | | |
| Sept. 13 | e | 12 | 6 | | | Traces. | |
| 14 | | 19 | 21 | | | Local tremor. | |
| 14 | | 19 | 44 | | | " " " | |
| 15 | Pg Sg | 0 | 46 | 51 | | 0.9 | |
| | | | 47 | 3 | | | |
| 15 | e L | 6 | 21 | | | 17 | |
| | | | 23 | | | | |
| 15 | | 6 | 50 | | | Local tremor. | |
| 15 | P | 11 | 23 | 51 | | 33.8 | |
| | PP | | 24 | 44 | | | |
| | S | | 29 | 16 | | | |
| | SS | | 32 | 38 | | | |
| | Lr | | 36 | | 25 | | |
| | M | | 38 | | 20 | | |
| 15 | P | 14 | 19 | 10 | | | |
| | S | | 27 | 29 | | 19 | |
| | i | | 29 | 15 | | | |
| | SS | | 31 | 20 | | | |
| | SSS | | 33 | 0 | | | |
| | L | | 36 | | 25 | | |
| | M | | 38 | | 20 | | |
| 15 | | 17 | 14 | | | Local tremor. | |
| 16 | eL | 6 | 6 | | | Traces. | |
| 16 | | 10 | 48 | | | " " | |
| 16 | | 18 | 40 | | | " " | |
| 17 | | 6 | 18 | | | " " | |
| 18 | | 12 | 2 | | | Local tremors; felt at Cheviot | |
| 18 | P | 15 | 9 | 23 | | 1.8 | |
| | S | | | 43 | | Felt at Cheviot, R-F 5; Epi- centre 42.5 S, 173 E (from Wellington and Christchurch) | |
| 18 | | 20 | 6 | | | Local tremor | |
| 19 | e L | 2 | 40 | | | 20 | |
| | | | 43 | | | | |
| 20 | eP | 1 | 55 | 15 | | 48.6 | |
| | i | | | 25 | | Manila $\Delta = 27^\circ$.1. Adelaide $\Delta = 30^\circ$.9, Riverview $\Delta = 31^\circ$.3, Melbourne $\Delta = 33^\circ$.1. Apia $\Delta = 49^\circ$.4. Epicentre near 5 S, 138 E. | |
| | i | | | 35 | | | |
| | PP? | | 58 | 20 | | | |
| | S | 2 | 2 | 16 | | | |
| | i | | 4 | 8 | | | |
| | SS? | | 5 | 30 | | 30 | |
| | Lr | | 9 | 55 | | 18 | |
| | M1 | | 12 | | | 20 | |
| | M2 | | 16 | | | 16 | |
| | M3 | | 20 | | | 14 | |
| | M4 | | 26 | | | 15 | |
| | | | | | | Lq also due about this time. | |
| | | | | | | Large Amplitudes. | |
| | | | | | | " " " " | |
| | | | | | | " " " " | |
| | | | | | | " " " " | |



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| Date 1935 | Phase | G.M.T. | | | Period sec. | Δ deg. | Remarks |
|--------------|-------|--------|-----|----|----------------|------------------|--|
| | | h | m | s | | | |
| Sep. 20 | eP | 5 | 31 | 40 | | 46.8 | Manila $\Delta=27^{\circ}.1$, Adelaide $\Delta=28^{\circ}.9$, Riverview $\Delta=30^{\circ}.0$, Apia $\Delta=47^{\circ}.3$, Chatham Islands $\Delta=59^{\circ}.6$. Epicentre near 7 S, 139 E. |
| | S | | 38 | 30 | | | |
| | SS | | 43 | 0 | | | |
| | Lq | | 43+ | | | | |
| | Lr | | 48 | 30 | 15 | | |
| | M1 | | 50 | | 18 | | |
| | M2 | | 52 | | 14 | | |
| | M3 | | 53 | | 15 | | |
| 20 | e | 21 | 12 | | | | |
| | L | | 31 | | 14 | | |
| 23 | P | 9 | 26 | 50 | | | |
| | PP | | 28 | 45 | | | |
| | PPP | | 29 | 32 | | | |
| | S | | 33 | 36 | | | |
| | i | | 35 | 2 | | | |
| | SS | | 37 | 34 | | | |
| | Lq | | 40 | 5 | 25 | | |
| | Lr | | 43 | 40 | 16 | | |
| | L | | 46 | 26 | 16 | | |
| | M | | 50 | | 18 | | |
| 24 | e | 4 | 21 | | | Traces | |
| 24 | i | 5 | 16 | 20 | | | |
| | eL | | 22 | | 20 | | |
| 24 | i | 8 | 8 | 48 | | | |
| | L | | 13 | | 17 | | |
| | M | | 15 | | 17 | | |
| 24 | eL | 23 | 4 | | 18 | | |
| 25 | i | 10 | 29 | 45 | | | |
| | iS? | | 35 | 19 | | | |
| | i | | 39 | 20 | 15 | | |
| | L | | 46 | | 15 | | |
| 25 | eL | 12 | 52 | | | Traces | |
| 26 | P | 22 | 23 | 45 | | 21.5 | |
| | S | | 27 | 35 | | | |
| | SS | | 28 | 55 | | | |
| | L | | 29 | 28 | 20 | | |
| | M | | 34 | | 9 | | |
| 27 | e | 3 | 58 | | | Traces | |
| 27 | | 5 | 54 | | | Local tremor. | |
| 27 | eL | 18 | 37 | | | Traces. | |
| 28 | Pg | 19 | 8 | 39 | | 0.3 | |
| | Sg | | | 43 | | | |
| 28 | | 21 | 2 | | | Local tremor | |



ARAPUNI:

Lat. $38^{\circ}5'$ S: Long. $175^{\circ}39'$ E. Height above M.S.L. = 212 ft.

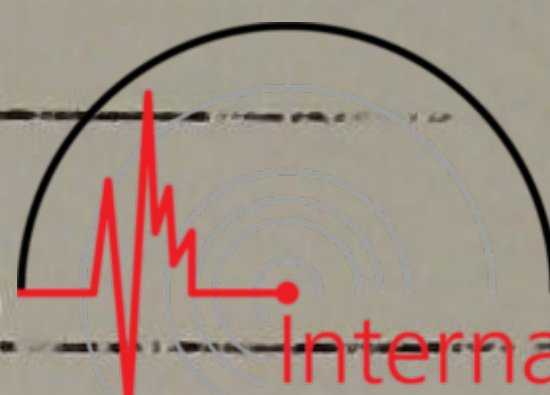
Lithologic Foundation: Rhyolite tuffs (Pliocene) more than 300 ft. thick, probably on Mesozoic rock.

INSTRUMENT: Milne Seismograph, E-W component; undamped.

CONSTANTS: Pendulum period = 24 secs. (1935 Aug. 11th) Magnification = 5.6

OBSERVER: District Engineer, Public Works Department, Arapuni.

| DATE 1935 | PHASE: | G.M.T. | | | PERIOD SEC. | Δ Deg | REMARKS |
|--------------|--------------------------|--------|----------------------------|----------------|----------------|-------------------|---------|
| | | H. | m. | s. | | | |
| July 11 | e e | 13 | 18 22 | | | | |
| 15 | Pg Sg | 11 | 59 (10) 20 | | 0.75 | Hour marks absent | |
| 15 | | 12 | 23 | | | Tremor | |
| 15 | | 12 | 38 | | | " | |
| 29 | P PP? S i | 7 | 42 44 45 | 30 36 4 | 15 | | |
| Aug. 3 | S? SS L M | 1 | 33 39 54 59 | 0 | | May be ScS | |
| 17 | P S L | 1 | 48 51 52 | 30 48 40 | 18 | Large amplitudes | |
| 19 | L M | 14 | 6 11 | | | | |
| Sept. 4 | eL | 2 | 4 | | | | |
| 9 | S L M | 6 | 35 (0) 42 44 | | | | |
| 11 | P S i i | 11 | 48 (21) 48 51 52 | | 8 | | |
| 11 | S SS Lq Lr M | 14 | 27 33 39 45 49 | 21 0 | | | |



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| DATE 1935 | PHASE | G.M.T. | | | PERIOD SEC. | Δ deg. | REMARKS |
|--------------|-------------------------------|---------------------|-------------------------------|----------------|----------------|------------------|---------|
| | | H. | m. | S. | | | |
| Sept. 15 | SS? L? | 11 | 30 32 | | | Phases not clear | |
| 15 | S L M | 14 | 27 36 37 | 30 30 | | | |
| 19 | eL | 2 | 43 | | | | |
| 20 | P S SS L MI M2 | 1 2 | 55 2 6 8 12 16 | 30 18 30 | 46.5 | Large amplitudes | |
| 20 | S L M | 5 | 38 45 48 | 24 48 | | | |
| 23 | P? S L M | 9 33 39 44 | 28 36 30 | | | P. very small | |
| 25 | eS? L M | 10 | 34 45 47 | | | | |
| 26 | L M | 22 | 30+ 32 | | | In time mark | |

TUAI:

Lat. 38° 48' S: Long. 177° 8' E. Height above M.S.L. = 960 ft.

Lithologic Foundation: Gravels (Pleistocene) probably 100 ft. thick on argillaceous sandstones and argillites (papas), o. middle Tertiary age.

INSTRUMENT: Milne-Jaggard Seismograph;

OBSERVER: Resident Electrical Engineer, Tuai.

| DATE 1935 | phase | G.M.T. | | | PERIOD SEC. | Δ deg. | REMARKS |
|--------------|----------|--------|-------|----|----------------|-----------|---------|
| | | H. | M. | S. | | | |
| July 15 | Pg Sg | 12 | 0 (0) | 12 | 0.9 | | |

NEW PLYMOUTH:

(Station A) Lat. $39^{\circ}4'$ S: Long. $174^{\circ}4'$ E. Height above M.S.L. = 112


Lithologic Foundation: Ash, agglomerate and lava at least 100 ft. on argillaceous sandstones and mudstones (Pliocene).

INSTRUMENTS: (Station A) Wood-Anderson short-period Seismograph, magnetic damping.
(Station B) Milne-Jaggard Seismograph.

OBSERVERS: (Station A) Superintendent, The Prison, New Plymouth.
(Station B) Mr. C.E. Moreshead, New Plymouth Hardware

| DATE 1935 | PHASE | G.M.T. | | | PERIOD Sec. | Δ deg. | REMARKS: |
|--------------|-------------|--------|----|------------------------|----------------|---|----------|
| | | H. | m. | s. | | | |
| July 3 | | 18 | 52 | | | Tremors | |
| 15 | P Pg? | 12 | 0 | (0) 5 | 1.8 | Wood-Anderson Light failed; readings from Milne-Jaggard record. | |
| | S Sg? | | | 21 31 | | | |
| 16 | P S | 1 | 22 | (36) 54 | 1.6 | | |
| 16 | | 4 | 10 | | | Tremors | |
| 16 | | 6 | 16 | | | Local shock; no phases shown. | |
| 16 | P S | 12 | 37 | (29) 45 | 1.4 | | |
| 16 | | 13 | 23 | | | Tremors | |
| 17 | P S | 3 | 26 | (37) 52 | 1.3 | | |
| 17 | | 4 | 56 | | | Tremors | |
| 17 | P S | 5 | 6 | (7) 28 | 1.8 | | |
| 17 | P S | 6 | 14 | (53) 15 12 | 1.7 | | |
| 18 | P S | 6 | 35 | (48) 36 18 | 2.6 | | |
| 18 | P | 6 | 57 | (51) 58 27 | 3.2 | | |
| 29 | P i S | 7 | 42 | (28) 44 38 45 30 | 18 | | |
| 31 | P S | 9 | 20 | (30) 21 2 | 2.8 | | |



| DATE 1935 | PHASE | G.M.T. | | | PERIOD SEC |  DEG. | REMARKS |
|--------------|--------------|--------|----------------------|---|---------------|---|---|
| | | h | m | s | | | |
| Aug. 3 | e L | 1 | 30 | | | | Distant Shock |
| 3 | . | 3 | 17 | | | | Local Tremor. |
| 9 | | 4 | 52 | | | | Local shock; no phases shown. |
| 10 | | 5 | 25 | | | | Tremors |
| 10 | P? S | 23 | 32 (54) 33 11 | | 1.5? | | P Faint |
| 13 | P | 15 | 47 (18) | | | | Faint record; S not visible. |
| 17 | P Lr? | 1 | 49 (0) 53 52 | | | | Strong microseisms; minute marks indistinct |
| 31 | | 6 | 57 | | | | Local shock; no phases shown. |
| Sep. 1 | P(?) S(?) | 10 | 10 (48) 11 18 | | | | Phases not clear |
| 1 | P S | 10 | 56(32) 59 | | 2,4 | | |
| 3 | P S | 17 | 36 (0) 20 | | 1.75 | | |
| 11 | | 12 | | | | | Distant Shock |
| 15 | L | 14 | 39 | | | | |
| 20 | P S Lr | 1 2 | 55 (0) 1 45 10 | | 46.0 | | |
| 20 | e Lr | 5 | 34 49 | | | | |
| 23 | e Lr | 9 | 29 45 | | | | |
| 26 | L | 23 | 30+ | | | | |



- 12 -
STRATFORD:

Lat. $39^{\circ}21'$ S: Long. $174^{\circ}17'$ E. Height above M.S.L. = 1000 ft.

Lithologic Foundation: Water-sorted volcanic debris, probably no more than 300 ft. thick, on argillaceous sandstone (papa) of Lower Pliocene age.

INSTRUMENT: Milne-Jaggar Seismograph.

OBSERVER: Mr. A.W. Burrell, Observatory, Stratford.

| DATE 1935 | PHASE | G M T H m s | PERIOD SEC | Δ DEG | REMARKS: |
|--------------|---------|-----------------|---------------|-----------------|------------------|
| JULY 15 | | 12 2 | | | Tremors |
| AUG. 9 | | 5 25? | | | Tremors |
| 13 | P? S | 15 45 (0) 14 | | 1.2? | P very uncertain |

HASTINGS:

Lat. $39^{\circ}38'$ S: Long. $176^{\circ}53'$ E. Height above M.S.L. = 35 ft.

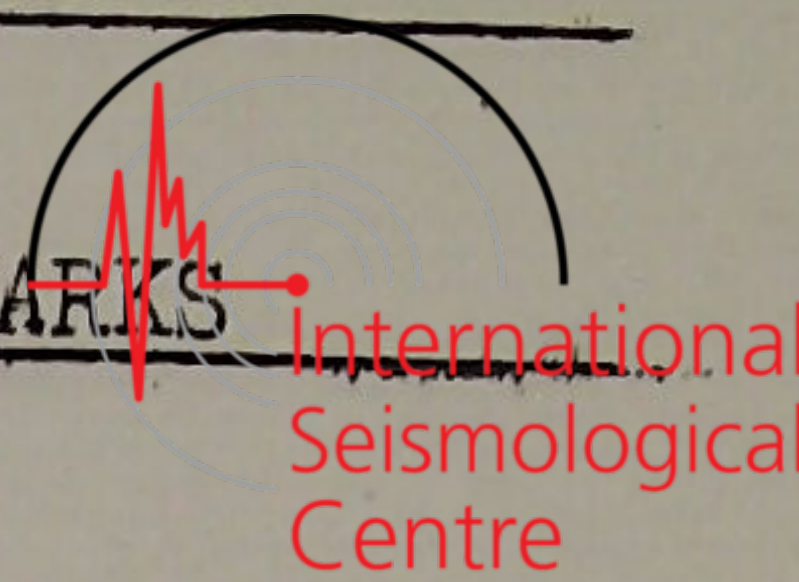
Lithologic Foundation: Alluvial sands, silts and gravels (recent Pleistocene) at least 500 ft. thick, probably on limestone and sandstone (early Pliocene).

INSTRUMENT: Milne-Jaggar Seismograph

OBSERVER: MR. HENRY DeDENNE, 304 South Nelson Street, Hastings.

| DATE 1935 | PHASE | G M T H m s | PERIOD SEC | Δ DEG | REMARKS |
|--------------|-----------------------|---------------------------------|---------------|-----------------|-------------------|
| July 14 | | 11 37 | | | Tremor |
| 15 | P Pg? S Sg? | 11 59 (30) 35 42 49 | | 1.1 | Large amplitude |
| 15 | P S? | 12 22(0) 18 | | 1.6? | |
| 16 | | 1 23 | | | Tremor |
| 17 | P? S | 6 15 (0) 15 | | 1.3? | P very small |
| 18 | | 6 36 | | | Irregular tremors |
| 28 | | 15 33 | | | Small tremor |
| 29 | P i S i i | 7 13 (0) 46 5 21 26 | | 18 | |

| DATE 1935 | PHASE | G M T h m s | PERIOD sec | Δ Deg | REMARKS |
|--------------|----------|----------------|---------------|-----------------|-------------|
| Aug 21 | | 6 4 | | | Local shock |
| 30 | Pg Sg | 2 52 (0) 4 | | 0.3 | |



CHRISTCHURCH (MAGNETIC OBSERVATORY):

Lat. 43°32' S: Long. 172°37' E. Height above M.S.L. = 25ft.

Lithologic Foundation: Gravels.

INSTRUMENT: Wood-Anderson Short-period Seismograph, magnetic dumping.

CONSTANTS: Pendulum period = 0.8 sec. Damping = 0.85 (1933 Sept.6th)

OBSERVER: The Director, Magnetic Observatory, Christchurch.

| DATE 1935 | PHASE | G M T h m s | PERIOD Sec | Δ Deg | REMARKS |
|--------------|------------------------|------------------------------|---------------|-----------------|----------------------------|
| July 15 | P? Pg? S? Sg? | 12 1 (4) 34 2 11 44 | | 5.5? | P. very small |
| 18 | | 6 35 | | | Tremors |
| 18 | | 6 59 | | | " |
| 29 | P S | 7 43 32 47 16 | | 23 | |
| 31 | | 9 20 | | | Tremors |
| 31 | | 10 9 | | | " |
| Aug. 10 | S | 23 35 57 | | | P. indistinct |
| 13 | | 0 19 | | | Tremor |
| 13 | P i S | 15 48 37 49 0 14 | | 3.2 | |
| 16 | P? S. | 15 41 56 44 2 | | 11.3? | P. small |
| 17 | i L | 1 49 57 | | | Distant shock |
| Sept. 1 | P S | 10 10 13 33 | | 1.8 | |
| 1 | P S | 10 56 38 56 | | 1.6 | |
| 11 | | 11 53 | | | Tremors from distant shock |
| 15 | L | 14 36 | | | |



| DATE 1935 | PHASE | G M T | | | PERIOD Sec | Δ Deg | REMARKS |
|--------------|-------------|-------|----|----------------|---------------|-----------------|---------|
| | | h | m | s | | | |
| Sept. 15 | | 17 | 15 | | | Local tremor. | |
| 18 | P i S | 12 | 2 | 40 47 52 | 1.1 | | |
| 18 | P i S | 15 | 8 | 12 19 24 | 1.1 | | |
| 20 | i L | 1 | 55 | 2 11 | | | |
| 20 | L | 5 | 52 | | | | |
| 23 | i L | 9 | 26 | 44 | | | |
| 26 | | 22 | 8 | | | Distant tremors | |
| 27 | | 5 | 55 | | | Local tremor | |

CHATHAM ISLANDS:

Lat. 43°57' S: Long. 176°31' W. Height above M.S.L. = 210 ft.

Lithologic Foundation: Volcanic breccia (probably early Miocene).

INSTRUMENT: Milne Seismograph, NE-SW component; undamped.

CONSTANTS: Pendulum period = 10 sec. (1935 Aug. 15th) Magnification = 6

OBSERVER: Superintendent, Radio Station, Chatham Islands.

| DATE 1935 | PHASE | G M T | | | PERIOD Sec | Δ deg | REMARKS |
|--------------|------------------------------|-------|------|-------------------------------------|---------------|----------|------------------------------------|
| | | h | m | s | | | |
| July 29 | P i S PCP? i | 7 | 43 | 6 24 48 36 48 | | 23 | |
| Aug. 3 | i L | 1 | 34.7 | 45 | | | |
| 13 | i | 0 | 17 | 48 | | | Small movements of short duration. |
| 16 | i | 15 | 41 | 8 | | | do do |
| 17 | P PP S SS L M | 1 | 49 | (30) 21 0 18 57 58.5 | 26.0 | | |
| Sep. 9 | | 6 | 30 | | | | Tremors |

| DATE 1935 | PHASE | G h | M m | T s | PERIOD sec | Δ deg | REMARKS |
|--------------|----------------------------------|--------|--------------------------------|-----------------------------|---------------|----------|---------|
| Sep. 11 | e i | 11 | 49 51 | 6 48 | | | |
| 11 | S L | 14 | 27 50 | 0 | | | |
| 20 | P PP PPP SS SSS L | 1 | 53 55 56 5 7 11 | (30) 55 55 30 0 | | | |
| 20 | P S L | 5 | 28 37 48 | (50) 0 30 | | 59.6 | |
| 23 | | 9 | 46 | | | | Tremors |
| 26 | S i L | 22 | 26 28 29 | 21 30 12 | | | |



NOTE: AT BUNNYTHORPE and GREYMOUTH no earthquakes were recorded during the period 1935 July 1st - September 30th.

SUPPLEMENT - REPORTS FROM PRIVATE STATIONS:

GLENMUICK:

Lat. 42°54' S: Long. 173°7' E. Height above M.S.L.= 247 ft.

Lithologic Foundation: Gravel on Tertiary Cretaceous and early Mesozoic rocks.

INSTRUMENT: Inverted Pendulum

OBSERVERS: Mr. C.J. Westland, F.R.A.S. and MR. A.S. WESTLAND

| DATE 1935 | PHASE | G h | M m | T s | PERIOD SEC | Δ DEG | REMARKS |
|--------------|----------------------|--------|-----------|----------------|---------------|----------|---------|
| July 15 | P S Sg? | 12 | 0 1 | 52 50 55 | | 5.1 | |
| 16 | e1 e2 | 12 | 37 | 40 52 | | | |
| 16 | Pg? Sg? | 13 | 22 | 30 42 | | 0.9? | |
| 29 | eP? e e eS? | 7 | 44+ 47 | 21 29 43 | | | |



DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH.

DOMINION OBSERVATORY.

WELLINGTON, N.Z.,
NEW ZEALAND.

SEISMOLOGICAL REPORTS.

for

OCTOBER, NOVEMBER, DECEMBER 1935.

In this report, where the clock correction is not known, the time of P (or first phase recorded), is enclosed in a bracket.

The reports of the various stations are arranged in order of latitude from North to South, except that of the central station at Wellington, which is given first.

For general notation, see "Modern Seismology", by G.W. Walker; also M.N.R.A.S. "Geoph. Supps." Love waves and Raleigh waves are designated L_q and L_r , respectively.

The term "Deep Focus" is used when the records of an earthquake show the characteristics of an abnormally deep focus. See "Proc. R. Soc. A. Vol. 132, 1931"; also "Geophysical Mag. Vol. 1, No. 4, 1928".

For methods employed in determining focal depths, see "Proc. R. Soc. A. Vol. 132, 1931", also "Proc. Imp. Acad. (Japan), Vol. 9, p. 497; and "Dominion Observatory Bulletin 107."

Tables used : (1) for normal focus earthquakes :-

Tables by H. Jeffryes and K. Bullen, 1935,
and

Travel-time graphs by B. Gutenberg and C.F.
Richter, 1934.

(2) for deep focus earthquakes :-

Graphs by F.J. Scrase; and tables by K. Wadati and
K. Masuda.

Observer : R. C. Hayes.

Director : C. E. Adams, D.Sc.,
F.R.A.S.

WELLINGTON (DOMINION OBSERVATORY)



Lat. $41^{\circ} 17' S$; Long $174^{\circ} 46' E$. Height above M.S.L. = 401.5 ft.

Lithologic Foundation : Greywacke (early Mesozoic or late Palaeozoic).

INSTRUMENTS.

Milne-Shaw Seismographs, numbers 13 and 36, magnetic damping.
 Wood-Anderson Short-period Seismograph; magnetic damping.
 Galitzin-Wilip Vertical Seismograph; photo-galvanometric registration,
 magnetic damping.

CONSTANTS.

| Seismograph and component | Date of Determination | Galvanometer Free Period | Pendulum Free Period | Damping Ratio | $\frac{AK}{L}$ |
|---------------------------|-----------------------|--------------------------|----------------------|---------------|----------------|
| Milne-Shaw (N) | 1935 Nov. 26th. | | 10.0 sec. | 20.1 | |
| Milne-Shaw (E) | " " 27th. | | 9.8 " | 20.1 | |
| Wood-Anderson (N) | " " 27th. | | 0.56 " | 8.1 | |
| Galitzin-Wilip (V) | 1934 Feb. 9th. | 10.6 sec. | 7.0 " | $\mu = + .43$ | 160 |

| DATE 1935 | PHASE | G.M.T. | | | PERIOD sec | Δ deg. | REMARKS. |
|--------------|-------|--------|----|----|----------------|--|----------|
| | | h | m | s | | | |
| Oct. 1 | | 7 | 15 | | | Local tremor. | |
| 2 | P | 5 | 45 | 45 | | | |
| | pP | | 46 | 0 | | | |
| | PP | | 49 | 11 | | | |
| | S | | 56 | 30 | | | |
| | ScS | | | 50 | | | |
| | PS | | 57 | 30 | | | |
| | L | 6 | 15 | | 30 | | |
| | M | | 18 | | 20 | | |
| 2 | | 11 | 35 | | | Local tremor. | |
| 2 | | 17 | 25 | | | " " | |
| 2 | e | 19 | 50 | | | Traces. | |
| 4 | eL | 5 | 18 | | 18 | " | |
| 4 | | 7 | 54 | | | Local Tremor. | |
| 5 | P | 6 | 40 | 11 | 1.3 | Felt in southern parts of North Island, max. R-F 4. Epicentre in vicinity of $40^{\circ}.8 S, 176^{\circ}.3 E$ (from Wellington, New Plymouth, Bunnythorpe). | |
| | S | | | 26 | | Very small shock. | |
| 5 | P? | 14 | 21 | 30 | 2.6 $^{\circ}$ | P very small. | |
| | S | | 22 | 0 | | | |
| 6 | P | 4 | 40 | 38 | 20.6 | Riverview $\Delta=20^{\circ}.7$, Melbourne $\Delta=26^{\circ}.8$ | |
| | PP | | 41 | 0 | | Manila $\Delta=60^{\circ}.0$ | |
| | i | | | 28 | | Epicentre $22^{\circ} S, 170^{\circ} E$. | |
| | S | | 44 | 20 | 6 | | |
| | SS | | | 55 | | | |
| | L | | 46 | | 15 | | |
| | M | | 49 | | 13 | | |



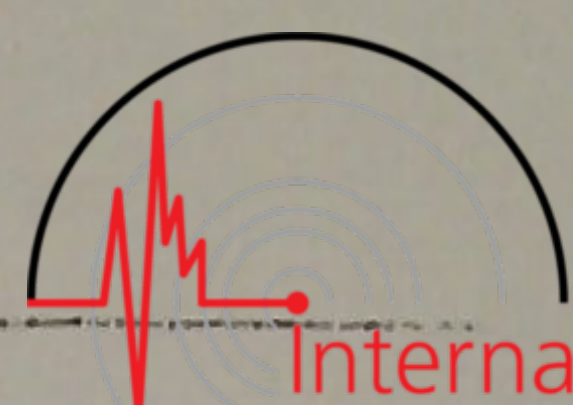
| DATE 1935 | PHASE | G.M.T. | | | PERIOD sec. | Δ deg. | REMARKS. |
|---------------|--|---------------|---------------|---|--------------------------|-----------|--|
| | | h | m | s | | | |
| Oct. 7 | | 5 | 48 | | | | Local Tremor. |
| 8 | P S | 1 | 9 | 11 25 | | 1.2 | |
| 8 | | 20 | 23 | | | | Local Tremors. |
| 10 | Pg Sg | 8 | 37 | 3 11 | | 0.6 | |
| 10 | | 20 | 20 | | | | Local tremor |
| 11 | | 1 | 22 | | | | " " |
| 11 | | 1 | 9 | | | | " " |
| 11 | P PP PPP S SS Lq Lr L M | 22 | 24 | 22 26 45 31 35 36 38 39 45 | 5 7 | | |
| 12 | | 16 | 4 | | | | Local tremor. |
| 12 | e eL M | 17 | 8 | 14 29 | 25 20 | | |
| 12 | | 19 | 51 | | | | Local tremor. |
| 15 | e L | 1 | 37 | 40 | 20 | | |
| 15 | eL | 10 | 47 | | 15 | | |
| 18 | e e L | 0 | 35 | 41 53 | 25 | | Prolonged. |
| 18 | P e iL M | 2 | 35 | 48 36 37 39 | 17 16 | | |
| 18 | eP iS | 8 | 27 | 28 57 | | | P very indefinite. Probably deep focus. |
| 18 | P PP PPP PcS S ScS SS L Lr? M | 11 | 15 | 41 58 45 10 0 24 12 33 35 38 | 7 5 12 35 20 | | |
| 18 | e eL | 15 | 28 | 46 | 17 | | Traces. |



| DATE 1935 | PHASE | G.M.T. | | | PERIOD sec. | Δ deg. | REMARKS. |
|--------------|--|--------|----------------|---------------|----------------|-----------|---|
| | | h | m | s | | | |
| Oct. 19 | | 7 | 18 | | | | Local tremor |
| 19 | | 13 | 42 | | | | " " , felt at Cape Campbell, R-F 2. |
| 20 | e L | 9 | 3 8 | 15 | | | |
| 21 | | 6 | 54 | | | | Local tremor |
| 22 | P S | 9 | 11 12 | 52 7 | 1.3 | | |
| 24 | P i PL? S PcP i PcS ScS | 23 | 57 58 59 | 34 30 4 | 19 | | Focal depth = 120 km (ScS-P). |
| | | 24 | 0 | 44 | | | |
| | | | 2 | 29 | | | |
| | | | 3 | 26 | | | |
| | | | 5 | 30 | | | |
| | | | 9 | 10 | | | |
| 25 | e i | 3 | 7 10 | | | | |
| 26 | | 22 | 9 | | | | Local tremor. |
| 27 | Pg Sg | 21 | 50 | 5 17 | 0.9 | | |
| 28 | | 13 | 35 | | | | Local Tremor. |
| 31 | eL | 23 | 35 | 20 | | | |
| Nov. 1 | e | 7 | 20 | | | | Tremors. |
| 1 | e L | 17 | 9 17 | 22 | | | |
| 1 | | 21 | 11 | | | | Local tremor. |
| 2 | Pg Sg | 4 | 1 | 9 19 | 0.75 | | Felt extensively in southern parts of North Island, max. R-F 5. Epicentre in vicinity of 41°S, 175°5E (from Wellington, New Plymouth, Christchurch). |
| 2 | | 8 | 53 | | | | Local Tremor; felt in Waira- rapa, R-F 3. |
| 4 | P S | 0 | 5 7 | 27 24 | 10 | | Deep Focus |
| 4 | eL M | 11 | 21 26 | 9 | | | |
| 4 | P S | 21 | 49 50 | 57 23 | 2.3 | | P small; felt at Westport, R-F 3-4. |
| 5 | P S | 1 | 39 | 10 37 | 2.4 | | Felt at Westport; R-F 3-4 |
| 5 | e eL M | 9 | 46 49 56 | 12 | | | |



| DATE 1935 | PHASE | G.M.T. | | | PERIOD sec | Δ deg | REMARKS. |
|--------------|---------------------------------------|--------|--------------------------------------|--------------------------|---------------|-----------------|---------------------------------|
| | | h | m | s | | | |
| Nov. 5 | e | 20 | 2 | | | | Traces. |
| 5 | eL | 20 | 28 | | | | " |
| 5 | eL | 21 | 10 | | | | " |
| 6 | e L | 1 | 54 56 | | 20 | | |
| 7 | Pg Sg | 1 | 2 | 47 51 | | 0.3 | |
| 7 | | 8 | 41 | | | | Local Tremor. |
| 7 | eL | 21 | 52 | | 13 | | |
| 8 | e | 20 | 21 | | | | Tremors. |
| 9 | P eL | 5 | 18 19+ | 43 | | | |
| 9 | | 20 | 47 | | | | Local Shock. |
| | | 23 | 11 | | | | " " |
| 10 | eL | 19 | 33 | | | | Tremors. |
| 11 | eL | 12 | 31 | | 18 | | |
| 11 | i i eL M | 13 | 26 30 32 40 | | 25 15 | | |
| 12 | | 9 | 19 | | | | Local tremor. |
| 12 | eL | 22 | 12 | | | | Traces. |
| 13 | e | 23 | 30 | | | | Prolonged movements. |
| 14 | P PP? S PcS SS? L M | 20 | 4 6 10 11 14 17 19 | 40 26 40 2 2 | 39.3 | | May be PcP. May be Lq. |
| 15 | P S | 3 | 7 | 13 25 | 20 20 | | 1.1 Felt at Paraparaumu, R-F 2. |
| 15 | | 11 | 27 | | | | Local tremor. |
| 15 | | 23 | 44 | | | | " " |
| 17 | P S | 2 | 9 | 16 31 | | 1.3 | |
| 17 | P S L M | 7 | 45 50 52 53 | 51 0 | 23.4 | | |
| 17 | | 16 | 3 | | 14 | | Local tremor. |



| DATE 1935 | PHASE | G.M.T. | | | Period sec. | Δ deg. | REMARKS. |
|--------------|--------------|--------|----------|----------|----------------|------------------|--|
| | | h | m | s | | | |
| Nov. 18 | Pg Sg | 9 | 13 | 17 21 | | 0.3 | |
| 18 | | 10 | 15 | | | | Local Tremor. |
| 18 | | 17 | 54 | | | | " " |
| 19 | eL | 6 | 14 | | 16 | | Prolonged. |
| 20 | | 12 | 27 | | | | Local tremor. |
| 20 | | 23 | 28 | | | | " " |
| 21 | | 3 | 10 | | | | " " |
| 21 | | 5 | 31 | | | | " " |
| 22 | | 2 | 24 | | | | " " |
| 22 | eL | 10 | 47 | | | | Tremors. |
| 23 | eL | 8 | 38 | | 21 | | |
| 25 | i eL M | 10 | 26 | 19 49 | | | |
| | | 11 | 1 | | 17 | | |
| 25 | | 10 | 45 | | | | Local tremor. |
| 25 | | 21 | 53 | | | | " " |
| 26 | P? S | 7 | 9 | 3 20 | | 1.5? | P very small |
| 26 | | 18 | 28 | | | | Local tremor. |
| 26 | P S | 19 | 36 37 | 52 6 | | 1.2 | Felt about Cook Strait and in northern parts of South Island, R-F 4. Epicentre in vicinity of 41° 3' S, 172° 8' E (from Wellington, Glenmuick, New Plymouth, Christchurch). Local tremors. |
| 27 | | 6 | 33 | | | | " " |
| 28 | | 19 | 54 | | | | " " |
| 30 | e L | 4 | 9 34 | | 15 | | |
| Dec. 1 | P? S | 16 | 20 | 33 52 | | 1.7? | P very feeble; felt at Paekakariki, R-F 4. |
| 2 | | 11 | 15 | | | | Local tremor. |
| 2 | | 12 | 36 | | | | Local tremor. |
| 3 | | 9 | 44 | | | | " " |
| 4 | eL | 15 | 6 | | | | Tremors. |



| DATE 1935 | PHASE | G.M.T. | | | Period sec. | Δ deg. | REMARKS. |
|--------------|---|----------|--|--------------------------|----------------------------|---|----------|
| | | h | m | s | | | |
| Dec. 5 | P S SS L M | 17 18 | 56 1 2 3 5 | 20 55 | 19 | | |
| 6 | P? i | 11 | 42 44 | 39 5 | | P very faint. Irregular tremors. | |
| 6 | iL | 21 | 46 | 15 | | " " | |
| 7 | Pg Sg | 13 | 32 | 46 52 | | 0.4 Felt at Paekakariki, R-F 4. | |
| 8 | | 18 | 28 | | | Local tremor. | |
| 8 | P S | 19 | 53 | 34 49 | | 1.3 Felt at New Plymouth, and at Manganui, R-F 4-5. | |
| 8 | e iL | 22 | 6 8 | 48 | 14 | | |
| 9 | e | 0 | 17 | | 13 | | |
| 9 | iP S SS Lq Lr? M1 M2 | 7 | 27 30 31 33 33+ 35 | 17 18 39 8 6 | 24 17 17 12 | 16.7 Az=Sw or SSW. Christchurch $\Delta=12^{\circ}.4$, Arapuni $\Delta=19^{\circ}.3$, Melbourne $\Delta=20^{\circ}.4$, Riverview $\Delta=22^{\circ}.8$, Adelaide $\Delta=27^{\circ}.6$. Epicentre $55^{\circ}S$, $164^{\circ}E$ | |
| 9 | P S | 17 | 11 | 45 55 | | 0.7 Felt at Paraparaumu, and Blenheim, R-F 2-3. | |
| 10 | | 8 | 0 | | | Local tremor. | |
| 10 | | 12 | 21 | | | " " | |
| 12 | eL | 6 | 14 | | | Tremors. | |
| 13 | | 10 | 36 | | | Local tremor. | |
| 13 | P S | 20 | 54 55 | 47 2 | | 1.3 | |
| 14 | i eL M | 1 2 | 53 19 24 | 35 | 24 16 | Irregular movements. | |
| 14 | | 7 | 1 | | | Local tremor. | |
| 14 | i i L M | 22 23 | 29 38 52 0 | 50 15 | 30 16 | Prolonged movements | |
| 15 | P i S? SS L M1 M2 M3 M4 | 7 | 14 17 20 22 24 30 35 37 39 | (28) 6 9 30 | 20 15 14 15 14 | 36.6? Minute marks failed. Apia $\Delta=24^{\circ}.6$, Riverview $\Delta=26^{\circ}.3$, Melbourne $\Delta=30^{\circ}0$, Adelaide $\Delta=32^{\circ}.3$, Epicentre $12^{\circ}S$, $163^{\circ}E$. Very large amplitudes. | |

| DATE 1935 | PHASE | G.M.T. | | | PERIOD sec. | Δ deg. | REMARKS. |
|---------------|---|----------|---------------------|---------------------|----------------|-----------|---|
| | | h | m | s | | | |
| Dec. 15 | e | 19 | 22 | | | | Tremors. |
| 16 | e | 6 | 26 | | | | Traces. |
| 17 | i L M | 13 | 28 | 50 | 17 | | |
| 17 | P S | 18 | 43 | 38 44 | | 6 | Deep focus. |
| 17 | | 19 | 3 | | | | Local tremor. |
| 17 | t L | 19 | 39 50 | 20 | 35 | | |
| 18 | | 1 | 9 | | | | Local tremor. |
| 18 | eL | 8 | 59 | | | | Tremors. |
| 18 | eL | 11 | 46 | | | | " |
| 18 | | 20 | 27 | | | | Local tremors. |
| 20 | P PP S SS L M M2 | 18 | 43 | 45 | | 31.9 | Riverview Δ=25°.2, Melbourne Δ=30°.0. Probable Epicentre 11°S, 161°E. |
| | | | 45 | 0 | 18 | | |
| | | | 49 | 0 | 16 | | |
| | | | 51 | 7 | 13 | | |
| | | | 53 | | | | |
| | | | 57 | | | | |
| | | 19 | 2 | | | | |
| 21 | eL | 9 | 8 | | | | Tremors. |
| 22 | e | 9 | 43 | | | | " |
| 23 | | 19 | 23 | | | | Local tremors. |
| 24 | | 1 | 35 | | | | " " |
| 24 | e eL | 12 13 | 49 13 | | 17 | | Very prolonged movements. |
| 25 | P iL? | 3 | 17 | 51 | | | |
| | | | 19 | 35 | | | |
| 26 | eL | 4 | 5 | | | | Traces. |
| 26 | P S? L? M | 5 | 36 | 55 | | | |
| | | | 38 | 28 | | | |
| | | | 39 | 10 | | | |
| | | | 41 | | | | |
| 26 | P S? L? M? | 10 | 36 | 54 | | | |
| | | | 38 | 37 | | | |
| | | | 39 | 19 | | | |
| | | | 41 | | | | |
| 26 | e | 13 | 6 | | | | Tremors. |
| 26 | P PP S L M | 20 | 11 | 25 | | | |
| | | | | 55 | | | |
| | | | 15 | 7 | 20 | | |
| | | | 16 | 35 | 20 | | |
| | | | 17 | | 20 | | |



| DATE 1935 | PHASE | G.M.T. | | | PERIOD sec. | Δ deg. | REMARKS. | |
|--------------|-------|--------|-----|----|----------------|------------------|---------------------------------|----|
| | | h | m | s | | | | |
| Dec. 27 | e | 17 | 57 | | | | Tremors. | |
| 27 | e | 19 | 17 | | | | " | |
| 28 | P | 2 | 47 | 35 | | | Az=WNW. Large amplitude. | |
| | PP | | 50 | 25 | | | | |
| | S | | 57 | 30 | | | | |
| | i | | 58 | 21 | | | | |
| | i | | 59 | 45 | | | | |
| | SS | | 3 | 2 | | | | 55 |
| | Lq | | 8 | | | | | 25 |
| | Lr | | 13 | | | | | |
| | L | | 14 | | | | | 35 |
| | M1 | | 19 | | | | | 25 |
| M2 | 22 | | 20 | | | | | |
| 29 | eL | 4 | 22 | | | | Tremors. | |
| 29 | P | 23 | 47 | 42 | | | | |
| | PP | | 48 | 40 | | | | |
| | S | | 54 | 42 | | | | |
| | SS | | 59 | 5 | | | | |
| | L | | 24 | 2 | | | | |
| 30 | eL | 4 | 53 | 4 | | | Traces. | |
| 30 | P | 23 | 32 | 4 | | | | |
| | S | | 35 | 40 | | | | |
| | L | | 37+ | | | | | |

EAST CAPE.*

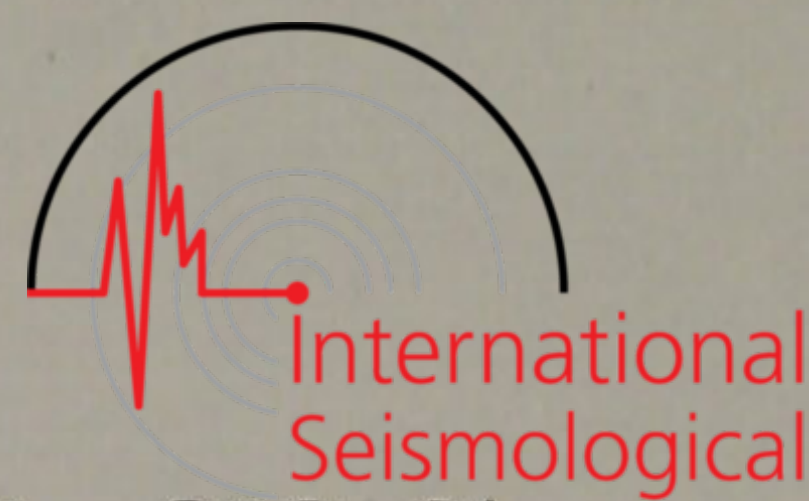
| DATE 1935 | PHASE | G.M.T. | | | PERIOD sec. | Δ deg. | REMARKS. |
|--------------|-------|--------|----|---|----------------|------------------|--------------|
| | | h | m | s | | | |
| Dec. 17 | | 18 | 43 | | | | Local Shock. |

* Lat. $37^{\circ} 40' S$; Long. $178^{\circ} 35' E$. Height above M.S.L.= 505 ft.

Lithologic Foundation : Rocks of Upper Miocene Age.

INSTRUMENT : Milne-Jaggard Seismograph.

OBSERVER : Mr. H.B. Jamieson, East Cape Lighthouse.

ARAPUNI.

Lat. $38^{\circ} 5' S$: Long. $175^{\circ} 39' E$. Height above M.S.L.=212 ~~2~~ ² ~~ft.~~ ^{ft.}

Lithologic Foundation : Rhyolite tuffs (Pliocene), more than 300 ft. thick, probably on Mesozoic rock.

INSTRUMENT : Milne Seismograph, E-W component; undamped.

CONSTANTS : Pendulum period 20 sec.(1935 Nov.21); Magnification 5.6

OBSERVER : Powerhouse Superintendent, Public Works Department.

| DATE 1935 | PHASE | G.M.T. | | | PERIOD sec. | Δ deg. | REMARKS. |
|--------------|-----------------------------------|--------|-----------------------------------|--------------------|----------------|--------------------|----------|
| | | h | m | s | | | |
| Oct. 2 | L M | 6 | 14 18 | | | | |
| 6 | iS? | 4 | 43 | 30 | | | |
| 11 | S SS L M | 22 | 32 35 37+ 41 | 30 | | In minute gap. | |
| 18 | S L? | 11 | 23 33 | 45 | | | |
| 24 | eP i | 23 | 57 58 | 0 50 | | | |
| Nov. 5 | i | 1 | 37 | | | Tremors. | |
| 14 | eS M | 20 | 10 17 | | | | |
| 17 | i | 7 | 49 | | | Irregular tremors. | |
| Dec. 5 | iS | 18 | 0 | | | | |
| 9 | P S L M | 7 | 28 31 33 34 | 0 30 | 19.3 | | |
| 14 | eL | 1 | 53 | | | Tremors. | |
| 14 | eL | 22 | 30 | | | Prolonged tremors. | |
| 15 | eP PcS? iS SS L? M | 7 | 14 19 20 22 25+ 26 | 12 24 0 5 | 37.3 | | |
| 17 | e M | 19 | 49 52 | | | | |
| 20 | e M | 18 | 43 54 | | | | |
| 24 | | 13 | 17 | | | Tremors. | |
| 25 | e | 3 | 17 | | | " | |

| DATE 1935 | PHASE | G.M.T. | | | PERIOD sec. | Δ deg. | REMARKS. |
|--------------|---|--------|---------------------|----------------|----------------|------------------|----------|
| | | h | m | s | | | |
| Dec. 26 | e | 5 | 36 | | | Tremors. | |
| 26 | e | 10 | 36 | | | " | |
| 26 | S L | 20 | 14 15 | 12 12 | | | |
| 28 | P PP S SS SSS L M M2 | 2 | 47 50 57 4 | 36 50 48 | | | |
| 29 | S | 23 | 54 | 48 | | | |
| 30 | eS | 23 | 35 | 30 | | | |



NOTE : at TNAI, no earthquakes were recorded during the period 1935 October 1st to December 31st.

NEW PLYMOUTH.

(Station A) Lat. $39^{\circ} 4' S$. Long. $174^{\circ} 4' E$. Height above M.S.L. = 112 Ft.

Lithologic Foundation. Ash, agglomerate and lava at least 100 ft. thick, on argillaceous sandstones and mudstones (Pliocene).

INSTRUMENTS : (Station A) Wood-Anderson Short-period Seismograph, magnetic damping.

(Station B) Milne-Jaggard Seismograph.

OBSERVERS : (Station A) Superintendent, The Prison, New Plymouth.
(Station B) Mr. C.E. Mershead, New Plymouth Hardware Company.

| DATE 1935 | PHASE | G.M.T. | | | PERIOD sec. | Δ deg. | REMARKS. |
|--------------|--------|--------|--------------|---|----------------|---|----------|
| | | h | m | s | | | |
| Oct. 5 | P S | 6 | 40(34) 41 | 2 | 2.5 | | |
| 6 | L | 4 | 46 | | | Distant shock. | |
| 7 | | 1 | 10 | | | Local shock, phases not clear. | |
| 8 | | 13 | 19 | | | " " phases not clear felt locally, R-F 2. | |

| DATE 1935 | PHASE | G.M.T. | | | PERIOD sec. | Δ deg. | REMARKS. |
|--------------|-------------|--------|----|---------------|----------------|------------------|--|
| | | h. | m. | s. | | | |
| Oct. 8 | Pg Sg | 16 | 54 | (30) | | 0.6 | |
| 11 | L | 22 | 38 | 38 | | | |
| 12 | | 16 | 4 | | | | Tremors. |
| 18 | | 8 | 30 | | | | " |
| 18 | | 11 | 18 | | | | Distant tremors. |
| 24 | | 16 | 17 | | | | Local shock. |
| 24 | P? S? | 21 | 52 | (2) 34 | | 2.8? | Phases not clear; felt in East Cape region, R-F 4. |
| 24 | | 23 | 59 | | | | |
| 27 | | 21 | 50 | | | | Local Shock. |
| Nov. 2 | P S | 4 | 1 | (48) 2 12 | | 2.1 | |
| 5 | | 1 | 39 | | | | |
| 9 | Pg Sg | 14 | 23 | (0) 4 | | 0.3 | Felt locally, R-F 3. |
| 12 | | 9 | 18 | | | | |
| 15 | P S | 3 | 7 | (20) 37 | | 1.5 | |
| 17 | P S | 2 | 9 | (0) 18 | | | |
| 21 | | 3 | 9 | | | | Local shock. |
| 26 | Pg Sg | 18 | 26 | (0) 8 | | 0.6 | |
| 26 | P S | 19 | 37 | (0) 25 | | | |
| Dec. 1 | P S | 16 | 20 | (30) 44 | | 1.2 | |
| 3 | Pg Sg | 12 | 17 | (53) 56 | | | |
| 8 | | 22 | 23 | | | | Tremors. |
| 8 | P S | 19 | 53 | (38) 53 | | 1.3 | |
| 9 | | 7 | 26 | | | | |
| 26 | | 5 | 34 | | | | Tremors from distant shock. Distant tremors. |
| 28 | P S L | 2 | 47 | (32) 57 25 | | | |
| | L | 3 | 14 | | | | |

Note; at STRATFORD, no earthquakes were recorded during the period 1935 October 1st to December 31st.



HASTINGS.

Lat. $39^{\circ} 38' S$; Long. $176^{\circ} 53' E$. Height above M.S.L. = 35 ft.

Lithologic Foundation : Alluvial sands, silts and gravels (recent Pleistocene) at least 500 ft. thick, probably on limestone and sandstone (early Pliocene).

INSTRUMENT : Milne-Jaggard Seismograph.

OBSERVER : Mr. Henry de Denne, 304 South Nelson Street, Hastings.

| DATE 1935 | PHASE | G.M.T. | | | PERIOD sec. | Δ deg. | REMARKS. |
|--------------|-------|--------|----|----|----------------|----------------------------|----------|
| | | h. | m. | s. | | | |
| Nov. 2 | | 4 | 2 | | | Tremors. | |
| 3 | | 11 | 26 | | | Local tremor; felt, R-F 3. | |
| 4 | | 0 | 7 | | | " " " R-F 3-4. | |
| Dec. 17 | | 18 | 45 | | | Tremor. | |

BUNNYTHORPE.

Lat. $40^{\circ} 17' S$; Long. $175^{\circ} 36' E$. Height above M.S.L. = 197 ft.

Lithologic Foundation : Gravels, sands and silts (recent and Pleistocene), probably several hundred feet thick, on argillaceous sandstone (middle Pleiocene).

INSTRUMENT : Milne-Jaggard Seismograph.

OBSERVER : Chief Engineer, Manawatu-Oroua Power Board, Palmerston North.

| DATE 1935 | PHASE | G.M.T. | | | PERIOD sec. | Δ deg. | REMARKS. |
|--------------|----------|--------|----|----------|----------------|------------------|-------------------------------|
| | | h. | m. | s. | | | |
| Oct. 5 | Pg Sg | 6 | 40 | (0) 5 | | 0.4 | |
| Nov. 2 | i | 4 | 1 | 0 | | | Local shock; no phases shown. |

Note; at TAKAKA, the Imamura seismograph was under overhaul during the period 1935 October 1st to December 31st.

at GREYMOUTH, no earthquakes were recorded during the period 1935 October 1st to December 31st.

CHRISTCHURCH (MAGNETIC OBSERVATORY)

Lat. $43^{\circ} 32'$ S. Long. $172^{\circ} 37'$ E. Height above M.S.L. = 25 ft.

Lithologic Foundation : Gravels.

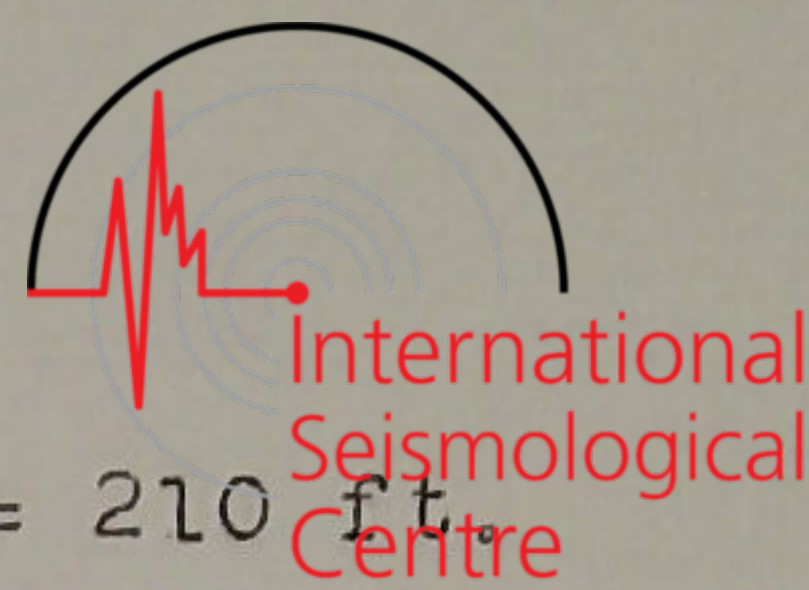
INSTRUMENT : Wood-Anderson Short-period Seismograph; magnetic damp

CONSTANTS : (1933 Sept. 6th.) Period = 0.8 sec. Damping = 0.85.

OBSERVER : Director, Magnetic Observatory, Christchurch.



| DATE 1935 | PHASE | G.M.T. h. m. s. | PERIOD sec. | Δ deg. | REMARKS. |
|--------------|---------|--------------------|----------------|------------------|-------------------------------|
| Oct. 8 | | 8 28 | | | Local shock. |
| 24 | P S | 16 15 3 24 | | 1.8 | |
| Nov. 2 | P? S | 4 1 57 2 32 | | 3.1? | |
| 4 | | 0 9 | | | Local shock; no phases shown. |
| 4 | P S | 21 49 53 50 13 | | 1.8 | |
| 5 | | 0 56 | | | Local tremor. |
| 5 | P S | 1 39 7 27 | | 1.8 | |
| 13 | | 19 5 | | | Local tremor. |
| 17 | | 2 10 | | | " " |
| 18 | | 9 13 | | | " " |
| 26 | P S | 19 37 11 36 | | 2.2 | |
| 28 | | 19 53 | | | Local tremor. |
| Dec. 9 | P | 9 26 43 | | | Distant shock. |
| 9 | | 17 11 | | | Local shock. |
| 14 | | 7 1 | | | " " |
| 15 | | 7 14 | | | Distant shock. |
| 17 | | 18 43 | | | Local shock. |
| 17 | | 19 3 | | | Tremor. |
| 20 | L | 19+ | | | Distant tremors. |
| 28 | | 2 47 | | | " " |

CHATHAM ISLANDS.

Lat. $43^{\circ} 57' S$. Long. $176^{\circ} 31' W$. Height above M.S.L. = 210 ft.
 Lithologic Foundation : Volcanic breccia (probably early Miocene).
 INSTRUMENT : Milne Seismograph, NE-SW component; undamped.
 CONSTANTS : Pendulum period 10 sec. (1935 Dec. 6th.), Magnification 6.
 OBSERVER : Superintendent, Radio Station, Chatham Islands.

| DATE 1935 | PHASE. | G.M.T. | | | PERIOD sec. | Δ deg. | REMARKS. |
|--------------|--------|--------|----|----|----------------|------------------|----------|
| | | h. | m. | s. | | | |
| Oct. 18 | | 2 | 40 | | | Tremors. | |
| 18 | | 11 | 17 | | | " | |
| 24 | e | 23 | 58 | 0 | | | |
| | i | | 59 | 12 | | | |
| | i | 24 | 0 | 7 | | | |
| Dec. 5 | e | 18 | 2 | | | | |
| | M | | 10 | | | | |
| 6 | e | 11 | 45 | | | Tremors. | |
| 9 | i | 7 | 32 | 48 | | | |
| | L | | 33 | 36 | | | |
| | M | | 37 | | | | |

MONOWAI.

Lat. $45^{\circ} 47' S$. Long. $167^{\circ} 37' E$. Height above M.S.L. = 538 ft.
 Lithologic Foundation : Tertiary Sandstone.
 INSTRUMENT : Milne-Jaggard Seismograph.
 OBSERVER : Chief Engineer, Southland Power Board, Invercargill.

| DATE 1935 | PHASE. | G.M.T. | | | PERIOD sec. | Δ deg. | REMARKS. |
|--------------|--------|--------|----|-----|----------------|------------------|----------|
| | | h. | m. | s. | | | |
| Nov. 8 | P | 4 | 36 | (0) | | 1.2 | |
| | S | | | 14 | | | |