

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

203 Collins Street,
MELBOURNE. C.1.



PROVISIONAL SEISMOLOGICAL BULLETIN

M E L B O U R N E

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

Foundation: Silurian sand and mudstone.

Instruments: Benioff Seismograph Variable Reluctance Type
three component long and short period recorders
galvanometer periods 14 sec. and 0.25 sec. respectively.
Magnification: Long period 3750 at 1 c.p.s.
Short period vertical 60,000 at 1 c.p.s.
Short period horizontals 30,000 at 1 c.p.s.
Milne Shaw seismograph EW component
Period 12 seconds
Damping coefficient 0.7
Magnification 250

No.	Date 1959	Phase	Time (G.M.T.)	Per	Amplitude			Remarks
					A _n	A _e	A _z	
			h. m. s.	s				
1	Jan. 1st	iP Z ipP Z eL NE	07 33 38 33 48 43.0	1.2 1.2				Compression USCGS: 19S 176W
2	1st	eP Z	07 57 06					USCGS: 8½S 177W
3	3rd	iP Z	15 52 36	0.7				Rarefaction
4	4th	eP Z eL N	03 24 19 37.0					USCGS: 10S 111½ E
5	4th	e Z	21 15 45					
6	5th	eP Z eL Z	09 41 34 54.0					USCGS: 7S 156½E
7	5th	iP Z ipP Z iPP Z iS E i E i(SS) NE i Z iScS E	09 52 36 52 47 53 25 57 12 57 36 58 44 59 23 10 03 17	1.2 1.7 3.0 3.0 7.0 8.0 1.5 4.0			1.6	Compression H = 09 46 51 △ = 3055 Km. USCGS: 22 S 171½E
8	6th	eP Z isP Z	14 56 35 56 49	2.0				USCGS: 7½S 105½E
9	8th	ePKP Z	01 53 26					USCGS: 15½N 61W
10	8th	(e) Z e NE i NZ i NZ	22 43 .. 55 07 57 38 58 08	10.0 12.0	38.0		49.0	
11	10th	iP Z	22 00 18	07				Rarefaction

No.	Date 1959	Phase	Time (G.M.T.)	Per	Amplitude			Remarks
					A _n	A _e	A _z	
			h. m. s.	s	μ	μ	μ	
12	Jan. 12th	iP	Z	17 50 28				Rarefaction
13	13th	e	Z	01 24 34				
		e	E	31 50				
14	15th	iP	NEZ	22 26 16	1.4			
		i	N	30 54				
		i	Z	31 51	1.3			
		i(S)	E	33 52	10.0			
15	16th	iP	Z	10 57 36	1.0		0.02	USCGS: 22S 170 E
16	18th	eP	Z	14 47 48				
		eL	Z	15 00.5				
17	18th	iP	EZ	22 29 53	0.8			Compression USCGS: 19S 178W
18	19th	iP	NEZ	08 52 56.5				Local tremor 18 Km. 116°6
		iS	N	52 58.3				E of N from Observatory.
		iS	Z	52 58.5				Felt in many southern and
								eastern suburbs of
								Melbourne with minor dam-
								age. Estimated intensity
								3-4 on modified Mercalli
								scale.
19	20th	eP	Z	16 52 50				Long period masked by
		(i)	N	17 00 45				microseisms.
		e	E	04 00				
		i	E	04 31	3.5	1.8		
20	22nd	eP	Z	05 22 10				H = 05 10 27 Δ = 8388 Km.
		eS	NEZ	31 46				USCGS: 34 N 142E
21	24th	eP	Z	05 20 12				USCGS: 37½N 141E
22	24th	iP	NEZ	07 59 07	1.0	0.07	0.05	0.08
		i	Z	59 12	1.5			Compression
23	26th	iP	EZ	05 55 51	1.0	0.07	0.08	Compression
24	27th	iP	Z	21 13 26	1.2			Compression
25	30th	e	Z	00 25 50				
		e	E	30 57				
		e	N	34 01				
26	30th	iP	NEZ	18 15 15	1.4			
		i	Z	15 31	1.1			
		i	N	19 27				
27	30th	i(P)	Z	18 20 59				
28	30th	e	Z	20 51 17				
29	30th	e	Z	22 29 06				



(J.M. RAYNER),
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PROVISIONAL SEISMOLOGICAL BULLETIN

M E L B O U R N E

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

Foundation: Silurian Sandstone and Mudstone

Instruments: Benioff Variable Reluctance Seismometers, 3 components,
Seismometer periods: 1 sec.
Short period recorder
Galvanometer period: 0.25 sec.
Magnification: Vertical 60000 at 1 c.p.s.
Horizontals 30000 at 1 c.p.s.

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

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

No.	Date 1959	Phase	Time (G.M.T.)	Per	Amplitude			Remarks
					An	Ae	Az	
30	Feb. 3	iP EZ	h. m. s. 23 28 12	s 0.9				Rarefaction.
31	4	iP Z	05 05 55	1.2				Rarefaction. USCGS: Off North coast of Mindanao P.I.
32	4	iP Z	08 42 08	0.8				Compression. USCGS: 22S 179 W.
33	6	iP Z	06 06 41	1.0			0.04	Compression.
34	7	ePP EZ	09 57 09	6.0				USCGS: 4 S 81½ W.
		i Z	57 37	6.0			5.4	
		eSKS E	10 02 56					
		eSKKS E	04 00					
		iPS EZ	07 08	8.0		4.1	9.3	
		e(SS) NE	13 20	24.0				
35	7	iP NEZ	16 52 48	0.9				Rarefaction.
		ipP Z	54 24	0.9				USCGS: 6½ S 113 E.
36	8	eP Z	16 00 28					USCGS: 32 S 176½ W.
37	9	iP NZ	21 20 01	1.0	0.2		0.3	Compression.
		iS NE	25 20	3.5	1.8	1.0		USCGS: 5 S 154 E
38	12	eP Z	17 09 07					H = (07 03 26) D = (3022) Km.
		iPP Z	09 20	1.2				USCGS: 22 S 173 E.
		i Z	10 20	3.0			0.9	
		eS E	13 42	4.0				
		eSS E	14 50	6.0				

No.	Date 1959	Phase	(G.M.T.)	Per	Amplitude			Remarks
					An	Ae	Az	
39	Feb. 14	iP	Z	04 43 20	1.1			Rarefaction. USCGS: 7 $\frac{1}{2}$ S 122 E
		ipP	Z	43 30	0.8			
		eSS	N	51 33				
		eSSS	N	52 03				
		e	E	53 00	6.0			
		i	N	54 25	6.0	3.8		
		e	N	56 14	5.0			
		i	N	57 31	6.0	4.2		
40	15	e	Z	04 11 48				USCGS: 44 $\frac{1}{2}$ N 83 $\frac{1}{2}$ E. Coda for two hours. Long period masked by micro- seisms.
		e	E	22 00	14.0			
41	16	iP	Z	08 00 21	0.8			Rarefaction.
42	17	eL	Z	12 54.0				USCGS: 51 $\frac{1}{2}$ N 171 W.
43	18	iP	Z	02 03 22	1.1			Rarefaction.
44	20	iP	Z	12 08 25	0.8			Compression.
45	22	iP	NZ	10 32 57	1.0		0.06	Rarefaction.
		e	N	34 11				
		i	N	38 15	4.0	1.2		
		e	N	39 11				
		i	E	44 37	5.0	3.2		
46	23	eP	Z	02 05 09				
		e	N	06 08				
		iS	N	10 16	8.0	5.2		
		i	NE	10 38	7.0	4.0	4.0	
		e	E	11 54	5.0			
		i	E	12 50	6.0	2.5		
		i	N	13 40	7.0	3.5		
47	23	iP	NEZ	18 41 15	0.8			Rarefaction.
48	23	iP	Z	22 27 36	0.7			Rarefaction.
49	25	iP	EZ	10 09 24	1.0	0.03	0.05	Rarefaction.
50	25	eP	NZ	20 15 20				
51	25	eP	NEZ	23 45 08				
		eL	NE	48.5				
52	27	eP	Z	13 53 30				
53	27	iP	Z	15 27 48	1.0		0.03	Rarefaction.
54	27	iP	Z	18 53 20	0.7			Compression.
		i	Z	58 29				
55	27	eP	Z	21 07 27				
		i	Z	07 41				
56	28	eP	NZ	11 48 09				
		e	Z	48 15				
		eS	E	51 28	8.0			
		iL	E	53 08	11.0	23.2		



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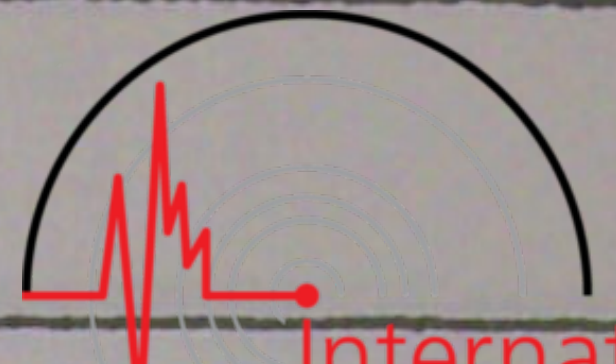
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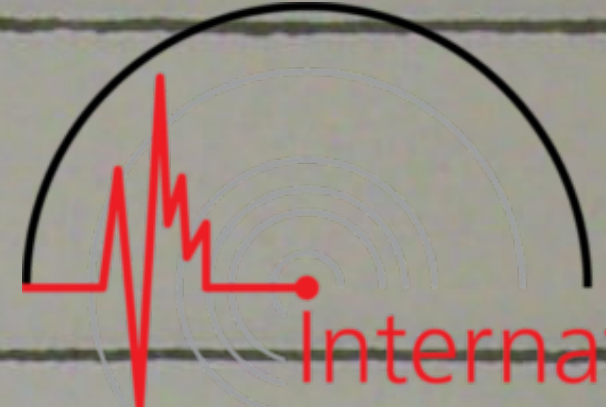
No.	Date 1959	Phase	Time (G.M.T.)	Per	Amplitude			Remarks
					A _n	A _e	A _z	
			h. m. s.	s	u	u	u	
57	March 1	eP Z	16 56 28					$\Delta = 4333\text{Km.}$ $H = 16\ 49\ 11$ $h = 0.01$ USCGS: $\frac{1}{2}S$ $134\frac{1}{2}E$
		i Z	56 41	0.8				
		ipP Z	56 49	1.5				
		i Z	56 54	1.5				
		i N	57 08	2.0				
		i(PP) NZ	58 09	2.0	2.5			
		iPPP Z	58 27	1.5			2.1	
		eS NE	17 02 19	6.0				
		i N	02 32	3.5	8.9			
		i N	02 41	12.0	44.0			
58	2	eP Z	09 20 25					USCGS: 8S 128E
		e(ScS)NEZ	30 26	8.0				
59	2	eP Z	10 34 (20)					USCGS: $20\frac{1}{2}S$ $175\frac{1}{2}W$
		i Z	34 32	0.6				
		i Z	34 44	0.6				
60	4	eP Z	19 02 16					USCGS: 11S 162E
61	6	eL NEZ	20 47.0					
62	8	eL NE	17 22.0					USCGS: 21S 170E
63	11	iP Z	06 00 57	0.7				
64	11	iP Z	07 13 57	0.8				Rarefaction USCGS: 6S $127\frac{1}{2}E$
65	12	iP Z	01 37 30	0.7				
		iS NE	44 08	7.0		6.5		Rarefaction $\Delta = 5022\text{Km.}$ $H = 01\ 29\ 14$ USCGS: 17N 145E
		eSS NE	47 28					
66	12	iP NZ	09 07 12	0.8				Rarefaction $\Delta = 3722\text{Km.}$ $H = 09\ 00\ 34$ USCGS: 5S 155E
		iS N	12 30	4.0	0.95			

No.	Date 1959	Phase	Time (G.M.T.)	Per	Amplitude			Remarks
					A _n	A _e	A _z	
			h. m. s.	s	μ	μ	μ	
67	March 13	eP Z	16 47 09					USCGS: 21S 176 $\frac{1}{2}$ W
68	15	iP NEZ i Z iS NE	12 38 33.6 38 38.6 38 49.3					Rarefaction. Small local tremor 141Km. 35°30' E of N from Melbourne. Reported from Merton.
69	17	iP Z	08 36 12	1.3				Rarefaction. USCGS: 27 $\frac{1}{2}$ N 130E
70	18	eP Z	00 52 12					USCGS: 27N 129E
71	19	e Z e Z	02 05 55 07 02					
72	20	e Z	23 21 30	0.9				
73	21	e Z e E e E	00 00 38 14 16 17 28	8.0 9.5				
74	21	iP NZ	02 18 51	0.8				Compression
75	21	iP NEZ iS E	04 33 54 39 04	1.0 4.0	0.07	0.10 1.7	0.17	Rarefaction
76	23	iP Z	13 32 03	0.7				Compression
77	25	iP NEZ	00 06 27	0.9				Compression
78	25	eP NEZ iS NEZ	04 31 57 32 15					Small local tremor 162Km. from Melbourne.
79	25	iP NEZ i E iS NEZ	12 30 44.0 30 45.8 30 47.0					Compression. Small local tremor 27Km. from Melbourne. Reported from Hughesdale.
80	25	e Z	15 01 30					
81	26	iP NZ i Z i Z i N i E	02 30 40 30 56 31 38 35 48 38 24	1.0 1.2 1.3 6.0 6.0	0.07 1.7	0.09 2.0		Rarefaction
82	26	iP NEZ	05 32 35	1.0	0.08	0.07	0.12	Rarefaction
83	28	iP NEZ 1pP EZ iS NE esS NE eScS E i N i E	19 53 28 55 13 58 29 20 01 36 02 32 02 37 06 44	1.0 1.6 4.0 8.0 4.0 4.0 7.0	0.06 2.3 1.7	0.07 4.6 5.0	0.17	Compression $\Delta = 4077\text{KM}$. h = 0.09 H = 19 47 09
84	31	iP Z i NEZ	06 23 05 23 07	0.5 0.7				
85	31	e Z eL NE	07 28 48 41.0	1.2				



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No.	Date 1959	Phase	Time (G.M.T.)	Per	Amplitude			Remarks
					A _n	A _e	A _z	
86	March 31	iP	Z	h. m. s.	u	u	u	Small local tremor 225km. from Melbourne.
		i	N	07 46 17				
		iS	NEZ	46 24 46 42				



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					A _n	A _e	A _z	
			h. m. s.	s				
87	April 1	eL NEZ	14 28.0		u	u	u	USCGS: 48S 98½E
88	1	eP Z	14 54 15					USCGS: 18S 169E
89	1	iP NZ	23 40 15	0.7				Compression. USCGS: 6S 154½E
90	2	iP Z	07 04 25	1.0			0.06	Rarefaction.
91	2	e Z	12 07(30)					
92	2	iP NZ	19 31 59					Compression. USCGS: 20½N 121E
93	5	ePKP Z	11 07 41					USCGS: 44N 7E
94	5	iP Z	21 11 55	1.0			0.06	Rarefaction. USCGS: 15½S 167½E
95	5	iP NZ	23 35 59	1.8				USCGS: 5½S 146E.
		eSS N	43 20	8.0				Long period masked by microseisms.
96	6	eP Z	14 19 36					H = 14 12 41 Δ = 3944Km.
		i Z	19 50	3.0			3.7	USCGS: 10S 120½E
		ePP Z	21 04	5.0				
		ePPP Z	21 17	5.0				
		iS NE	25 09	6.0	5.0	2.1		
		e E	26 26	7.0				
		iSS N	27 50	4.0	4.3			
		i(SSS) E	28 20	4.0		3.3		
		e E	30 40	6.0				
		i N	30 54	6.0	8.6			

No.	Date 1959	Phase	Time (G.M.T.)	Per.	Amplitude			Remarks
					A _n	A _e	A _z	
			h.m.s.	s	<i>u</i>	<i>u</i>	<i>u</i>	
97	April 8	iP NEZ	01 28 53	1.3				Rarefaction. H= 01 28 53 h = 0.06 Δ = 3166Km. USCGS: 32 $\frac{1}{2}$ S 179 $\frac{1}{2}$ E
		epP Z	30 10	4.0				
		iS E	33 10	4.0		2.9		
		e(SS) Z	35 42	17.0				
98	8	iP EZ	08 09 18	1.0				Compression. USCGS: 17S 174 $\frac{1}{2}$ W
99	8	i Z	11 57 09	1.4			0.06	
100	9	eP Z	06 27 56	0.8				H = 06 18 26 Δ = 6110Km. USCGS: 36S 76E
		i Z	28 00	1.8			2.0	
		iS N	35 28	7.0	4.0			
101	10	iP Z	05 53 08	1.0			0.03	Compression. H = 05 47 40 h = 0.09 Δ = 3389Km. USCGS: 25S 178 $\frac{1}{2}$ E
		i NEZ	53 10	1.0	0.15	0.27	0.45	
		ipP Z	54 51	2.0				
		iS NE	57 28	4.0	3.6	5.9		
		e E	06 00 27					
102	11	eP Z	11 36 28					H = 11 28 46 Δ = 4555Km. USCGS: 1S 128E
		eS E	42 37					
103	12	iP Z	15 29 18	1.1				Compression. USCGS: 4 $\frac{1}{2}$ S 134E
		eS N	34 48					
		i E	35 08					
		e E	37 58					
		e E	38 16					
		eScS N	39 08	4.0				
104	12	iP Z	21 02 02	0.8				Compression.
105	12	iP Z	21 02 16	1.1				Compression. USCGS: 15 $\frac{1}{2}$ S 173W
106	16	iP Z	07 32 16	1.0			0.04	Compression. USCGS: 23 $\frac{1}{2}$ S 179E
107	16	iP Z	16 22 49	1.7				Compression. USCGS: 12 $\frac{1}{2}$ N 143E
		i Z	23 04	1.5				
108	18	iP Z	06 24 43	0.7				Compression. USCGS: 4 $\frac{1}{2}$ S 154E
		i Z	25 03	0.8				
		e Z	31 04	2.0				
109	20	eP NZ	03 34 15					USCGS: 6S 149 $\frac{1}{2}$ E
		iS NE	39 26	7.0	3.0	4.5		
		i N	42 00	6.0	2.5			
		i E	43 03	8.0				
110	20	e Z	11 57 ..					
111	22	iP Z	02 00 48	0.8				
112	24	iP Z	18 04 19	1.5				Compression. H = 17 58 07 Δ = 3389Km. USCGS: 31S 178W
		e Z	04 36	2.0				
		iPP E	05 20	4.0		3.9		
		ePPP EZ	05 35	4.0				
		iPoP N	07 05	4.0	1.4			
		iS EZ	09 17	4.0		2.8	1.1	
		isS N	09 37	6.0	5.4			
		e E	10 20	6.0				
		iSS E	11 07	7.0		7.0		

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			h.m.s.	s	<i>u</i>	<i>u</i>	<i>u</i>	
113	April 25	iP NZ	05 28 57	1.0	0.02		0.02	Rarefaction
114	26	iP NZ	20 51 11	1.2				Compression.
		i NZ	51 15	1.0	0.15		0.21	H = 20 40 33 h = 0.01
		epP NEZ	51 35					$\Delta = 7210\text{Km.}$
		e Z	52 09					USCGS: 25N 122 $\frac{1}{2}$ E
		e E	52 33					
		i Z	56 17	1.0			0.12	
		iS E	59 47	10.0		18.6		
		iS NE	21 00 32	12.0	10.0	35.0		
115	27	iP NEZ	09 54 57	1.0	0.05	0.03	0.12	Rarefaction. H = 09 48 27
		e Z	55 48					$\Delta = 3611\text{Km.}$
		iPP Z	56 02	2.0			0.71	USCGS: 7S 120E
		iS NE	10 00 08					
		e Z	02 00					
116	28	e Z	02 03 ..					
		i E	03 55	6.0		2.3		
117	28	eL EZ	12 08 00					
118	28	e Z	13 07 32					
119	30	iP Z	13 38 20	0.8				Compression.



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					A _N	A _E	A _Z	
			h. m. s.	s.				
120	May 1	e Z	07 34 ..					USCGS: $3\frac{1}{2}$ S $135\frac{1}{2}$ E
121	1	iP Z	15 03 38	1.1				USCGS: 5S 154E
122	4	iP NZ	07 28 48	1.8				Rarefaction. H = 07 15 40
		i Z	29 15					h = 0.005, Δ = 10,332Km.
		i E	29 24					USCGS: $52\frac{1}{2}$ N $159\frac{1}{2}$ E.
		i N	39 11	8.0	16.1			
		iS NE	39 44	9.0	30.0	85.1		
		iS N	40 17					
		i E	40 27	11.0		103.6		
		e N	40 48					
		iSPP NZ	41 32	8.0	23.0		5.7	
		iPPS N	41 40	9.0	35.1			
123	5	eP Z	19 17 27					
124	6	iP Z	17 35 48	0.9				USCGS: 18S 179W
		e E	18 09 04					
125	6	iP Z	18 59 45	1.0			0.04	Rarefaction.
								USCGS: 3S 128E
126	7	eP Z	00 10 17					USCGS: 3S $148\frac{1}{2}$ E
		i Z	12 02	5.0		2.5		
		iPcP Z	12 44	4.5		1.26		
		i E	16 24	5.0		2.1		
		i Z	17 32	6.0			3.3	
127	7	e Z	09 10 38					USCGS: $3\frac{1}{2}$ S $149\frac{1}{2}$ E
128	7	e Z	11 24 07					USCGS: $3\frac{1}{2}$ S 150E
129	7	eP Z	20 29 36					
		i N	41 34	5.0	2.85			
		e E	42 38					
		eL Z	44 40					
130	8	iP Z	11 47 57	1.4				Rarefaction.
								USCGS: $53\frac{1}{2}$ N $160\frac{1}{2}$ E.

No.	Date 1959	Phase		Time (G.M.T.)	Per.	Amplitude			Remarks
						A _N	A _E	A _Z	
131	May 10	iP	Z	00 09 27					
132	11	iP	EZ	03 04 44					Rarefaction. Small local tremor $\Delta = 27\text{Km.}$
		iS	EZ	04 47					
133	12	iS	E	05 22 12	8.0		5.2		USCGS: 54½N 168E
134	12	eL	NE	08 23.0					USCGS: 9½S 159E
135	12	ePP	Z	10 06(10)					USCGS: 23½S 64½W
		ePS	N	16 08					
		eL	Z	41.0					
136	14	e	Z	00 58 33					
137	14	ePKP	Z	06 56 12					USCGS: 35½N 24½E
		e	Z	59 38					
		iPKS	Z	59 48	5.0		1.43		
138	14	eP	Z	09 39(30)					USCGS: 19S 170E
139	14	eP	Z	11 55(15)					USCGS: 19S 170E
140	14	eP	Z	13 25 18					USCGS: 19S 170E
✓ 141	16	iP	Z	06 23 03					H = 06 16 19 $\Delta = 3833\text{Km.}$ h = 0.005 USCGS: 4½S 153½E
		ipP	Z	23 23	1.2				
		iS	NE	28 24	4.0		2.6		
		iaS	E	28 48	6.0		4.2		
		iSSS	E	31 07					
142	18	iPn	NEZ	06 13 53.3					Compression. Local tremor 477Km. 64° 40'E of N from Melbourne. Felt from Sydney to NSW-VIC. border.
		i(Pg)	NE	14 06					
		e	N	14 24					
		iSn	N	14 46					
143	20	iP	Z	19 47 30	1.9				USCGS: 44½N 149E
		iaP	Z	47 43	1.5				
144	21	e	NEZ	11 32(10)					
145	22	iP	Z	07 02 09	0.9				USCGS: 40S 176E
146	24	e(PP)	Z	19 38 10					USCGS: 17½N 97W
✓ 147	26	iP	Z	04 23 45	1.4				H = 04 12 57 $\Delta = 7499\text{Km.}$ h = 0.01 USCGS: 27½S 126½E
		ipP	Z	24 09	1.6				
		iS	N	32 32	6.0	2.5			
148	28	iP	Z	22 33 57	1.0			0.07	Compression. USCGS: 43 14½E
149	28	iP	Z	22 44 01	1.0			0.06	Rarefaction.
✓ 150	29	iP	Z	10 48 34					USCGS: 19S 169½E
		ipP	EZ	48 59	1.4				
		i	N	53 34	5.0	1.8			
		i	E	53 48	10.0				
		i	E	54 14	5.0		3.6		
		i	N	54 38	6.0	6.2			
		i	E	54 50	7.0		5.0		
		iSS	E	54 56	6.0		17.5		
		iSSS	E	55 10	8.0		9.77		
		iPeS	E	55 34	5.5		6.9		
151	✓ 31	iP	Z	09 34 47	1.2				Rarefaction.
		iS	N	40 17	6.0	3.75			
		iL	E	42 47	12.0		12.0		

(J.M. RAYNER),
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DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

203 Collins Street,
MELBOURNE. VIC.

PROVISIONAL SEISMOLOGICAL BULLETIN

MELBOURNE

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

Foundation: Silurian Sandstone and Mudstone

Instruments: Benioff Variable Reluctance Seismometers, 3 components,
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Galvanometer period: 0.25 Sec.
Magnification: Vertical 60000 at 1 c.p.s.
Horizontals 30000 at 1 c.p.s.

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

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

No.	Date 1959	Phase	Time (G.M.T.)	Per.	Amplitude			Remarks
					A _n	A _e	A _z	
152	June 1	iP Z	h. m. s. 05 37 51	s. 1.0			0.09	Rarefaction. USCGS: 4S 153E
153	1	iP NZ	12 38 26	0.8				Compression. H = 12 32 30
		ipP Z	39 51	1.0			0.017	$\Delta = 3577$ Km. h = 0.07
		iS NZ	43 12	12.0	8.0		6.0	USCGS: 6S 154E
154	1	iP Z	17 13 53					Compression.
		i Z	14 04					USCGS: $6\frac{1}{2}$ S $155\frac{1}{2}$ E
		iS N	19 26	6.0	2.0			
		i E	22 38	7.0		3.5		
155	1	iP Z	19 31 55					
156	2	iP Z	03 38 51					Compression. USCGS: $25\frac{1}{2}$ S 176W
157	2	eL NEZ	03 41.0					USCGS: 25S 176W
158	2	eP Z	03 59 03					USCGS: $25\frac{1}{2}$ S 176W
159	2	iP Z	05 07 48					USCGS: 21N $121\frac{1}{2}$ E
160	2	iP Z	15 34 06	0.8				Rarefaction
161	4	iP EZ	01 02 54	1.0			0.05	Rarefaction
162	4	iP Z	01 58 22					Rarefaction
163	7	eP Z	08 43 40					USCGS: Samar, Philippine Is.
164	9	iP Z	14 59 30	0.8				
		i Z	59 33	0.8				
165	10	eP Z	13 12 48					
166	14	ePP Z	00 31 25					USCGS: $20\frac{1}{2}$ S 68W
		i NZ	32 06	9.0	6.8		13.5	
		iSKS E	37 10	6.0		3.3		
		ePS NEZ	41 00	11.0				
		i E	43 00	9.0		9.5		
		iSS E	47 13	12.0		17.0		
167	14	eP Z	17 29 14					

No.	Date 1959	Phase	Time (G.M.T.)	Per.	Amplitude			Remarks
					A _n	A _e	A _z	
168	June 14	iP	Z	h. m. s. 21 08 51	s. 0.7			Rarefaction USCGS: 23 $\frac{1}{2}$ S 179 $\frac{1}{2}$ W
169	15	e	Z	02 49 36				
170	18	eP	Z	07 00 39				USCGS: 55S 129W
171	18	eP	Z	15 44 40				H = 15 31 29 = 10,332Km.
		i	Z	44 57				USCGS: 54N 160E
		eS	E	55 38				
		eS	N	55 51	5.0	3.2		
		i	NE	56 12	5.0	2.9	5.0	
172	18	iP	Z	16 11 53	1.5			Rarefaction USCGS: 54N 161E
173	21	iP	Z	11 20 43	1.0		0.05	Compression
174	27	iP	EZ	19 10 24	1.6			Compression. Long period
		i	EZ	11 12	2.0	3.2	1.8	masked by microseisms.
		e	N	14 30				
		iS	N	14 56	9.0	11.5		
175	28	iP	NEZ	19 50 15	1.0	0.03	0.03	USCGS: 9 $\frac{1}{2}$ S 122 $\frac{1}{2}$ E
		i	NEZ	50 16	1.0	0.37	0.37	
176	29	e	Z	07 22 33				
		eL	N	27.5				
177	29	iP	EZ	13 28 05	1.0	0.85	0.15	USCGS: 6N 126 $\frac{1}{2}$ E
		i	Z	28 27	1.0		0.05	
178	30	eP	Z	10 29 25				

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203 Collins Street,
MELBOURNE. VIC.



PROVISIONAL SEISMOLOGICAL BULLETIN

M E L B O U R N E

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

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

No.	Date		Phase	Time (G.M.T.)	Per	Amplitude			Remarks
	1959					A _N	A _E	A _Z	
				h. m. s.					
179	July	2	iP Z	11 40 34	1.0			0.03	USCGS: 20S $178\frac{1}{2}$ W Compression
180	✓ 3		iP Z	18 01 44	1.6				Rarefaction
			i Z	01 49					USCGS: 16S $172\frac{1}{2}$ E
			i Z	02 27					
			e NE	07 06					
			i NE	07 50	12.0	14.0	38.0		
			i Z	08 20	12.0			20.0	
			iL E	12 04	8.0		8.0		
181	6		i(PKP) Z	09 41 46	6.0			4.2	USCGS: $26\frac{1}{2}$ S $61\frac{1}{2}$ W
			iPP Z	44 49	6.0			5.8	
182	9		ePKP Z	16 24(40)					USCGS: $20\frac{1}{2}$ S 68W
183	11		eL E	05 03.0					
184	11		iP Z	12 10 54	2.0				Compression H = 12 01 33
			iS E	18 22	9.0		11.8		USCGS: 36S 78E.
			iL E	26 00	12.0				$\Delta = 5999$ Km. Long waves for 30 minutes.
185	12		e Z	00 20 02					
186	12		iP EZ	00 30 59	0.7				Compression. USCGS: $19\frac{1}{2}$ S $177\frac{1}{2}$ W
187	16		eP Z	20 19 34					
			i Z	19 43	1.6				
188	18		iP NEZ	19 36 51					Rarefaction
189	18		eP Z	20 04 40					H = 19 54 48 $\Delta = 6444$ Km.
			i Z	05 19	2.0				USCGS: $15\frac{1}{2}$ N $120\frac{1}{2}$ E
			iPcP Z	05 28	1.5				
			ePcS Z	09 16					
			iS NE	12 30	4.0	1.7	5.7		
			iPS N	12 56	9.0	8.1			
			i(SS) NE	16 18	8.0	10.4	13.8		

No.	Date 1959	Phase	Time (G.M.T.)	Per	Amplitude			Remarks
					A _N	A _E	A _Z	
			h. m. s.	s.				
190	July 19	eP Z	03 50 43					USCGS: 6 $\frac{1}{2}$ S 105E
191	19	eP Z	13 50 47					USCGS: 23 $\frac{1}{2}$ S 179E
192	19	ePKP Z	15 24 37					USCGS: 15S 70 $\frac{1}{2}$ W
		ePP Z	25 50					
		eSKS E	31 09					
		eL NE	35.0					
193	20	iP NEZ	02 48 34	1.0	0.13	0.17	0.28	Rarefaction.
		iPcP Z	50 09	1.0			0.08	USCGS: 6S 110E.
		iPP Z	50 25	2.0			0.74	
		i Z	53 12	1.5				
		i NE	54 30	4.0	0.57	1.71		
		i E	57 35	4.0		1.71		
194	20	iP Z	16 59 27	1.2				Compression.
								USCGS: 23 $\frac{1}{2}$ S 179E
195	21	eL E	01 59.0					
196	21	eP Z	07 49 35					USCGS: 14 $\frac{1}{2}$ S 167 $\frac{1}{2}$ E
197	22	iP NEZ	11 23 43	1.2				Rarefaction.
								USCGS: 2N 126 $\frac{1}{2}$ E. Long period masked by micro- seismic storm.
Very severe microseismic storm 0600hr. 22nd - 0300hr. 29th caused by a very low depression centred off S.E. Tasmania.								
✓198	22	e Z	23 09 04					
		iS NE	14 20					
199	23	iP Z	15 03 39	0.8				
200	24	iP Z	22 13 01	1.0			0.04	
201	24	eP Z	23 15 48					
202	29	iP EZ	00 37 23	1.2				Rarefaction.
203	30	iP EZ	13 00 20	1.0			0.04	Rarefaction.
204	31	iP EZ	20 45 19	1.2				Rarefaction.

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No. 59/8

203 Collins Street,
MELBOURNE. VIC.

PROVISIONAL SEISMOLOGICAL BULLETIN
MELBOURNE

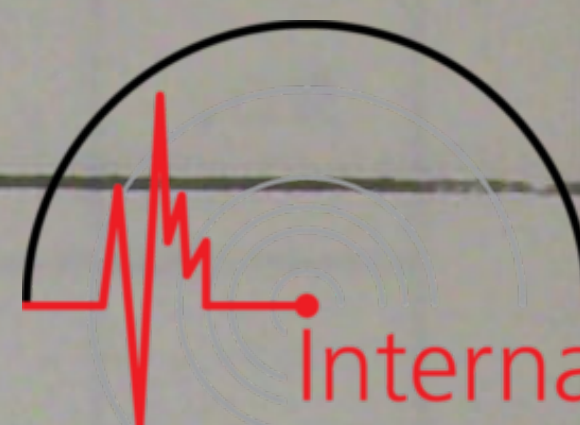


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Magnification: 3750 at 1 c.p.s.
Milne Shaw Seismograph, E-W component,
Period: 12 sec.
Damping Coefficient: 0.7
Magnification: 250

No.	Date 1959	Phase	Time (G.M.T.)	Per	Amplitude			Remarks
					A _N	A _E	A _Z	
			h. m. s.	s.	μ	μ	μ	
205	August 2	iP NZ iS EZ	15 53 44 54 31					Small local shock $\Delta = 423\text{Km.}$
206	5	iP Z	08 08 33	0.8				Rarefaction
207	9	iP NEZ	02 42 46	1.2				Compression USCGS: 2N 128E
208	10	eP NEZ i Z e(S) E i E eLq E eLr NEZ	00 40 42 40 51 44 00 44 11 44.6 45.8	1.5 4.0 14.0 11.0		2.3		H = 00 36 33 USCGS: $55\frac{1}{2}\text{S}$ 146E $\Delta = 2115\text{Km.}$
209	11	iP NEZ	05 41 34					Rarefaction. Local shock. $\Delta = 180\text{Km.}$
210	11	iP NEZ eS NE	16 53 01 53 21					Rarefaction
211	11	i Z eL NEZ	21 56 04 22 05.0					USCGS: 11S 163E
212	✓ 12	e Z i Z i NE iL NE	10 06 00 09 20 09 24 15 00	 5.0 18.0		5.4		USCGS: $16\frac{1}{2}\text{S}$ $177\frac{1}{2}\text{W}$
213	14	eP Z i Z	04 47 02 48 00					USCGS: 0 $125\frac{1}{2}\text{E}$
214	14	iP Z	04 48 58	1.0			0.05	Rarefaction
215	14	iP Z	21 14 36	0.8				Compression

No.	Date 1959	Phase		Time (G.M.T.)	Per	Amplitude			Remarks
						A _N	A _E	A _Z	
✓ 216	August 15	eP	NZ	h. m. s. 09 07 36	s.	<i>m</i>	<i>m</i>	<i>m</i>	 H = 08 56 51 USCGS: 23N 121E $\Delta = 7345\text{Km.}$
		e	Z	07 55					
		iPcP	NZ	08 09	4.0	2.64		4.12	
		i	E	08 27	4.0		3.53		
		iPP	Z	10 07	3.0			1.86	
		i	N	16 08					
		iS	EZ	16 14	7.0		8.5	5.0	
		ePS	N	16 45					
		iSKS	E	17 32	6.0		10.4		
		i	E	23 08					
		i(SSS)	E	23 32					
		iL	E	30 25					
217	15	iP	NEZ	21 37 11					Rarefaction. USCGS: 17 $\frac{1}{2}$ S 177W
218	16	e	EZ	00 57 24					
		e	EZ	01 02 00					
		eL	NE	05.5					
219	16	iP	NEZ	10 00 26	1.0	0.07	0.1	0.22	Compression USCGS: 18S 178W
		e	Z	01 41	1.5				
220	17	iP	NZ	05 11 11	0.5				Rarefaction. Small local shock $\Delta = 423\text{Km.}$
		iS	Z	11 58					
✓ 221	17	eP	NZ	21 11 07					USCGS: 7 $\frac{1}{2}$ S 156E
		i	E	11 48					
		iS	NE	16 17	8.0				
		L max.	E	22 38	14.0		(513)		
222	18	iPKP	Z	06 56 23					USCGS: 44 $\frac{1}{2}$ N 111W
		iPP	NZ	58 08	8.0			5.4	
		iSKS	NE	07 03 34	8.0	4.05	3.38		
		eSKKS	NE	05 06					
		i	E	05 36					
		e(PcPKP)	E	08 20	10.0				
		ePPS	Z	09 24					
		e	E	07 12 24	12.0				
		e	E	15 28	0.5				
		i	E	16 02	24.0				
223	18	i	Z	15 45 08					USCGS: 44 $\frac{1}{2}$ N 111W
224	20	eL	E	02 14.0					
225	20	e	Z	09 01 45					USCGS: New Britain.
226	20	e	Z	12 29 19					
227	20	iP	Z	16 08 58					Rarefaction
228	20	e	Z	17 42 34					
229	21	iP	NZ	08 06 25					Rarefaction
		i	E	06 45					H = 08 03 00.4
		i(S)	E	08 54					USCGS: 50 $\frac{1}{2}$ S 139 $\frac{1}{2}$ E $\Delta = 1489\text{Km.}$
230	21	iP	NZ	09 40 57	1.5				Compression.
		i	Z	41 13	1.5				H = 09 37 42
		eS	E	43 30					USCGS: 50 $\frac{1}{2}$ S 140E $\Delta = 1536\text{Km.}$
✓ 231	24	iP	Z	21 37 05					H = 21 30 45
		iPP	Z	37 09					USCGS: 10 $\frac{1}{2}$ S 161E
		iPP	NEZ	38 10					$\Delta = 3489\text{Km.}$
		ePPP	NEZ	38 24					
		iS	NE	42 09					
232	24	iP	NEZ	23 23 13					

No.	Date 1959	Phase		Time (G.M.T.)	Per	Amplitude			Remarks
						A _N	A _E	A _Z	
				<i>h. m. s.</i>	<i>s.</i>	<i>u</i>	<i>u</i>	<i>u</i>	
233	August 25	iP	NEZ	06 12 58					Small local shock. $\Delta = 27\text{Km.}$
		iS	NEZ	13 00					
234	25	iP	NZ	13 46 42					Rarefaction
		iS	NZ	46 52					
235	28	iP	NEZ	06 10 38					Rarefaction. Local shock. $\Delta = 22.4\text{Km.}$
		eS	NEZ	10 40					
236	28	iP	NEZ	15 58 09					Compression. H = 15 52 08 USCGS: 17S 167E. $\Delta = 3240\text{Km.}$
		ePP	Z	59 04					
		iPPP	Z	59 17					
		eS	NE	16 02 53					
		eSS	NE	04 29					
		iSSS	NE	04 50					

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					A _N	A _E	A _Z	
			h. m. s.	s.				
237	Sept. 3	iP NEZ	06 35 00.5	1			0.03	Rarefaction.
		iPP EZ	35 43.7					H = 06 27 25.9 Δ = 3510Km.
		ePPP EZ	36 54.7					USCGS: $4\frac{1}{2}$ S 123E
		iS NE	40 57.7					
		eSS NE	43 40.7	4		5.0		
		iSSS E	44 14.7	4		5.0		
238	4	eP NZ	08 09 57.7					
		e(S) N	10 36.2					
239	4	iP Z	08 59 31.2					Rarefaction.
								USCGS: $4\frac{1}{2}$ S 152E
240	4	iP Z	12 36 26.5					USCGS: $31\frac{1}{2}$ S 177W
		ipP Z	36 37					
241	5	iP NEZ	05 49 26.8	8	1.1			Compression.
		i NEZ	49 29.6					
		i NEZ	49 30.2					
242	5	iP NEZ	06 15 27.7	3		1.6		Compression.
		ipP Z	15 34.2					USCGS: 1N 129E
243	5	eP Z	07 05 52.2					USCGS: 62S 156E
244	5	eP NEZ	15 35 04.9					
245	5	iP NEZ	15 42 33.1					USCGS: 1N 129E
		i NEZ	42 36.5					
		e NE	48 52.3					
246	5	e(S) NEZ	21 49 49.6					USCGS: 51N $179\frac{1}{2}$ E
247	5	iP NEZ	23 11 33.5	0.5				Rarefaction.
								USCGS: 18S $178\frac{1}{2}$ W.
248	6	iP Z	00 36 31.5	1			0.03	Rarefaction
		ipP Z	37 13.8					H = 00 28 08.1 Δ = 4230Km.
		ePP Z	38 18					USCGS: $5\frac{1}{2}$ N $126\frac{1}{2}$ E
		eS N	43 25					

No.	Date 1959	Phase	Time (G.M.T.)	Per.	Amplitude			Remarks
					A _N	A _E	A _Z	
			h. m. s.	s.	μ	μ	μ	
249	Sept. 8	iP Z	13 24 03.9	1.5			0.02	Compression.
250	8	iP Z	20 31 06.8	1			0.02	Compression.
251	9	i(P) NEZ	04 20 41.7					
		i(S) NEZ	21 29.2	1			0.03	
252	10	iP NEZ	05 41 29.5	0.8			0.05	Compression.
		ipP NEZ	41 49.5	0.8			0.13	USCGS: 6 $\frac{1}{2}$ S 154 $\frac{1}{2}$ E
		iPcP Z	44 24.5	1			0.05	
253	10	i(P) Z	10 42 00.5					Compression.
254	12	cP Z	02 00 42					USCGS: 3S 146 $\frac{1}{2}$ E
255	12	iP NZ	11 30 39.5	2			1.0	Rarefaction.
		eS N	35 40					H = 11 24 23.8 Δ = 2790Km.
								USCGS: 9 $\frac{1}{2}$ S 156E
256	14	eP Z	13 22 55.9					Compression.
								USCGS: 24S 176 $\frac{1}{2}$ W
257	14	iP Z	14 16 15.9	1			0.04	Compression.
258	14	iP NEZ	15 05 19.4	1			0.06	Compression.
								USCGS: 28 $\frac{1}{2}$ S 176 $\frac{1}{2}$ W
259	14	iP NEZ	17 12 53.4	0.8			0.05	Rarefaction.
		i NEZ	14 22.9					USCGS: 29S 176 $\frac{1}{2}$ W
260	14	iP NZ	22 30 30.4	1			0.07	Rarefaction.
								USCGS: 29S 177W
261	15	iP NEZ	06 06 22.8	2.8			1.8	Compression.
		ipP NEZ	06 39.8					USCGS: 28 $\frac{1}{2}$ S 177W.
		e N	11 09					
		e E	11 36					
262	15	iP Z	06 24 10.8	1			0.07	Compression.
								USCGS: 28 $\frac{1}{2}$ S 176 $\frac{1}{2}$ W
263	15	iP Z	08 07 02.8	1			0.06	Compression.
								USCGS: 28 $\frac{1}{2}$ S 177W
264	15	iP NEZ	11 11 39.8					Rarefaction.
		ipP NEZ	13 18.3					USCGS: 21 $\frac{1}{2}$ S 179 $\frac{1}{2}$ W
		i(S) NEZ	16 27.3	4			2.8	
265	15	iP Z	13 52 57.8					Compression.
								USCGS: 29S 177W
266	16	iP Z	02 10 11.3	1			0.02	USCGS: 29S 176 $\frac{1}{2}$ W
267	16	iP NEZ	02 42 36.8					USCGS: 29S 176 $\frac{1}{2}$ W
268	16	i Z	03 39 10.3					
269	16	i Z	03 42 04.3					
270	16	iP Z	16 03 46.3	0.8			0.02	
		i Z	03 58.5					
		e(S) N	11 33.8					
271	17	iP Z	02 01 51.0					
272	17	iP Z	06 00 49.8					
273	17	iP Z	06 11 56.5					
		i Z	11 58.0					
		i Z	12 08.0					
274	17	iP Z	06 33 42.0					
275	17	eP Z	14 42 55.0					USCGS: 28 $\frac{1}{2}$ S 176W
276	17	eP Z	14 58 24.5					USCGS: 28 $\frac{1}{2}$ S 176W



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No.	Date 1959	Phase	Time (G.M.T.)	Per.	Amplitude			Remarks
					A _N	A _E	A _Z	
			h. m. s.	s.				
277	Sept. 18	eP Z	09 31 16.5					USCGS: 28 $\frac{1}{2}$ S 176 $\frac{1}{2}$ W
278	18	e(P) Z	12 13 46.5					USCGS: 57 $\frac{1}{2}$ S 24W
279	23	iP Z	02 09 07.5					Local shock.
		iS NEZ	09 09.8					
280	25	iP NEZ	00 22 09.3	1.2			0.05	Compression.
		i NEZ	22 28.3	1.2			0.04	USCGS: 9S 113 $\frac{1}{2}$ E
281	25	iP NEZ	02 47 21.8	1.5			0.07	Rarefaction. H = 02 36 49.4
		eS NE	55 57.8					Δ = 5800Km.
								USCGS: 22N 122E
282	27	iP NEZ	10 27 12.3	1			1.2	Rarefaction.
								USCGS: 5 $\frac{1}{2}$ S 129 $\frac{1}{2}$ E
283	27	e(P) Z	10 34 19.5					
284	29	iP NEZ	15 38 39					Rarefaction.
								USCGS: 29S 176 $\frac{1}{2}$ W
285	30	iP Z	20 31 57					H = 20 26 01.5 Δ = 2600Km.
		iPPP Z	33 02.5					USCGS: 18S 168E
		eS NE	36 42					
		eSS N	38 06					
=								



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(J.M. RAYNER)
DIRECTOR.

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

203 Collins Street,
MELBOURNE, Vic.



PROVISIONAL SEISMOLOGICAL BULLETIN

MELBOURNE

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

Foundation: Silurian Sandstone and Mudstone

Instruments: Benioff Variable Reluctance Seismometers, 3 components,
Seismometer periods: 1 Sec.
Short period recorder
Galvanometer period: 0.25 Sec.
Magnification: Vertical 60000 at 1 c.p.s.
Horizontals 30000 at 1 c.p.s.
Long period recorder
Galvanometer period: 14 Sec.
Magnification: 3750 at 1 c.p.s.
Milne Shaw Seismograph, E-W component,
Period: 12 Sec.
Damping coefficient: 0.7
Magnification: 250

No.	Date 1959	Phase	Time (G.M.T.)	Per.	Amplitude			Remarks
					A _n	A _e	A _z	
			h m s	s	μ	μ	μ	
286	Oct. 2	iP NEZ iS NEZ	02 16 17 16 20					Rarefaction
287	3	eL N	23 25					
288	5	iP NEZ i(S) EZ	07 18 47.5 18 51					
289	5	iP Z	10 05 03.4					
290	6	iP NEZ ePP Z	05 52 27.8 54 13.3					Compression
291	7	i Z	02 04 04.5					
292	7	i(P) Z i(S) Z	06 11 49.9 11 52.4					
293	7	i Z	07 01 29.9					
294	7	iP Z iS Z i(L) Z	23 56 31.5 56 34.0 56 35.5					Local shock
295	8	e(P) Z e Z	00 09 24.5 09 33.5					
296	9	iP Z iS Z	07 30 02.5 30 04.2					Compression Local shock
297	12	eP Z	03 31 56					

No.	Date 1959	Phase	Time (G.M.T.)	Per.	Amplitude			Remarks
					A _n	A _e	A _z	
			h m s	s	μ	μ	μ	
298	Oct. 12	eP Z	21 28 42					 International Seismological Centre
299	15	iP NEZ iS NEZ	06 10 33.5 10 37.0					
300	15	iP EZ iPP Z iS NEZ eSS N iScS NZ	06 23 46 25 27 30 19 33 30 33 41					
301	16	iP NEZ i(S) NEZ	04 22 40.0 22 43.0					Local shock
302	16	eP Z ePP Z	16 23 24 25 16					USCGS: 6N 125E
303	17	iP NZ iS NEZ	04 21 04.5 21 07.0					Local shock
304	17	iP NEZ	08 42 33.5					Compression
305	19	iP Z	01 31 56.5					USCGS: 30S 178W
306	19	i(P) EZ i Z	02 02 17.2 02 22.0					Local shock
307	19	iP NEZ i Z	07 03 28.0 03 30.5					Local shock
308	19	iP Z eFP Z	08 34 04.0 35 21					Rarefaction USCGS: 27½S 177W
309	19	iP NZ iPP NZ iS NE	16 08 25 11 46 19 06	4 6		3.7	5	Rarefaction H = 15 55 34 Δ = 9835 Km. USCGS: 54½S 29W
310	19	iP Z	13 58 44					Compression USCGS: 22S 179½W
311	21	eP Z	20 58 05.5					USCGS: 4S 154E
312	23	iP NEZ	03 50 12.5					Compression USCGS: 4S 154E
313	23	i Z	07 00 28.0					Near tremor
314	26	iP NEZ iS NEZ i(L) EZ	06 36 57.0 36 59.0 37 00.2					Local shock
315	26	iP Z iPcP Z ePP Z eS NE	07 46 52.5 47 02 49 45 56 29	8	1.7	2.2		Compression H = 07 35 11.5 Δ = 8500 Km. USCGS: 37½ 142½E
316	26	iP Z ipP Z	10 41 57 42 27					Compression USCGS: 51½N 157½E
317	26	iP NEZ iS NEZ	12 22 03.5 22 17.5					Strong local shock Δ = 120 Km.

No.	Date 1959	Phase	Time (G.M.T.)	Per.	Amplitude			Remarks
					A _n	A _e	A _z	
			h m s	s	μ	μ	μ	
318	Oct. 26	iP NEZ e(S) E	23 40 57.5 47 28					Rarefaction
319	27	i NEZ	02 33 03.0					
320	27	iP Z eS NE	07 05 14.5 15 33	6 12	12	10	3	Compression H = 06 52 49.5 Δ = 9420 Km. USCGS: 45 $\frac{1}{2}$ N 151E
321	28	iP NEZ iS NEZ	02 03 52 03 54.5					Local shock
322	28	iP EZ iS NEZ	02 08 39.5 08 41.5					Local shock
323	28	iP NZ i NEZ	06 33 36.5 33 37.5					Local shock
324	28	iP EZ iS NZ i(L) NEZ	07 06 12.0 06 13.5 06 15.0					Local shock
325	29	iP NEZ i Z	14 26 27 26 30					USCGS: 29 $\frac{1}{2}$ S 176 $\frac{1}{2}$ W
326	29	iP NZ ipP Z	14 41 46 43 50	2			0.7	Compression USCGS: 43N 131E
327	30	iP NEZ	07 11 26.5	0.8				USCGS: 19S 177 $\frac{1}{2}$ W
328	30	iP NEZ iS NEZ	07 13 46 13 47.5					Local shock
329	30	i EZ	07 22 15.5					Local shock
330	30	eP Z	14 03 33					USCGS: 23 $\frac{1}{2}$ S 175 $\frac{1}{2}$ W
331	30	i(P) NEZ	21 44 05	1				Rarefaction
332	31	eP Z iP NEZ iPP Z iPcP Z iS NEZ	04 33 59.5 34 02.0 35 39.5 35 55.5 39 30.5	2 4	0.7 3.5	0.7 3.5	0.8 1.8	Compression H = 04 27 06 Δ = 4440 Km. USCGS: 16 $\frac{1}{2}$ S 178W
333	31	e Z	10 31 43.5					

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Magnification: 3750 at 1 c.p.s.
Milne Shaw Seismograph, E-W component,
Period: 12 Sec.
Damping Coefficient: 0.7
Magnification: 250

No.	Date 1959	Phase	Time (G.M.T.)	Per	Amplitude			Remarks
					A _N	A _E	A _Z	
			h. m. s.	s.				
334	Nov. 1	iP NEZ	20 19 45.5		μ	μ	μ	Local
		iS NEZ	19 48.0					
335	2	i(P) EZ	01 20 03.8					USCGS =(about)33S,135E
		i(P) Z	20 04.8					(Canberra analysis).
		i N	21 32.8					
		i(S) Z	21 46.8					
		i(S) EZ	21 48.8					
		i Z	21 59.5					
336	2	eP NEZ	08 54 02.0					Compression.
								USCGS = $22\frac{1}{2}^{\circ}$ N $144\frac{1}{2}^{\circ}$ E
337	2	eP Z	20 10 02.0					Compression.
		ipP Z	10 12.0					H = 20 03 31.5
		iS NEZ	15 12.5	7	-4	-2	-1.5	Δ = 3620 Km.
								USCGS: $5\frac{1}{2}^{\circ}$ S $151\frac{1}{2}^{\circ}$ E
338	3	iP NEZ	09 47 52.0	2	+0.4	+0.4	-0.7	Rarefaction.
		i Z	47 54.0					H = 09 40 09
		ipP Z	48 00.5					Δ = 4580 Km.
		i Z	48 29.0					USCGS: $10\frac{1}{2}^{\circ}$ S 111° E
		iS E	54 03.0					
		iPS E	54 09.0					
		iPS N	54 11.0	5	+1.4			
339	5	iP NEZ	11 56 34.0					Compression.
								USCGS: 13S, $166\frac{1}{2}^{\circ}$ E
340	5	iP NEZ	17 44 32.0					Rarefaction.
								USCGS: 9S, $157\frac{1}{2}^{\circ}$ E
341	5	i(P) NEZ	18 05 42.0					
342	6	iP Z	01 13 55.0					Compression.
		eS N	18 59.0					H = 01 07 32
								Δ = 3500 Km.
								USCGS: 9S, $157\frac{1}{2}^{\circ}$ E

No.	Date 1959	Phase	Time (G.M.T.)	Per.	Amplitude			Remarks
					A _N	A _E	A _Z	
			h. m. s.	s.				
343	Nov. 6	iP Z	01 17 58.5					USCGS: 9S 157 $\frac{1}{2}$ E Compression.
344	6	iP Z	11 50 18.5					Compression. USCGS: 24S 174 $\frac{1}{2}$ W
345	7	eP Z e(PPP) NZ	22 23 24.0 25 16.0					USCGS: 23 $\frac{1}{2}$ S 175 $\frac{1}{2}$ W
346	8	iP NEZ iPcP Z iS NE eScS N	14 07 16.0 07 22.0 17 34.0 17 44.0	6	+1.7	-2.5		Compression. H = 13 54 50 Δ = 4270 Km.
347	8	iP Z	14 33 50.0					
348	10	iP NEZ iS NEZ	15 08 31.5 08 35.5					Local shock.
349	11	iP NEZ i(S) NEZ	23 39 28.0 39 31.0					Local shock.
350	13	i Z	10 12 05.0					
351	15	iP Z	08 11 22.5					USCGS: Fiji Islands.
352	15	iPKP Z i(PKP) Z ePP Z e(PKS) N ePPS Z eSS NE	17 28 11.5 28 15.5 30 54.0 31 44.0 43 02.0 48 44.0					USCGS: 37 $\frac{1}{2}$ N 20 $\frac{1}{2}$ E
353	16	iP Z	23 52 01.5					USCGS: 4N 126 $\frac{1}{2}$ E
354	17	iP Z	15 24 24.0					Compression. USCGS: 9S 119E
355	17	e NZ eL E	17 41 20.0 43.8					USCGS: 5S 141E
356	18	eP NEZ iS NEZ	07 29 56.0 29 58.0					Local shock.
357	19	iP EZ	05 32 50.0					Compression.
358	19	iP Z i(P) Z ipP Z isP Z isPP Z iS E i(sS) E iScP Z	11 15 02.0 15 04.5 15 29.5 15 40.0 16 41.0 20 09.0 20 38.0 21 29.0	2 4 8	-0.5 -3 +23	+0.7 +0.6 -15	+4.5 +9	Compression. H = 11 08 37.5 USCGS: 5 $\frac{1}{2}$ S 146E
359	20	iP Z	00 27 03.5					Rarefaction. USCGS: 4 $\frac{1}{2}$ S 153E
360	20	iP EZ iS NEZ	09 00 40.5 00 42.0					Local
361	20	eP NZ	11 03 40.5					
362	20	iP EZ	15 24 46.0					Compression. USCGS: 15 $\frac{1}{2}$ S 174W
363	20	eP NEZ	16 37 32.5					USCGS: 7S 129E
364	21	iP NEZ iS NEZ	02 02 58.8 03 00.2					Local
365	21	iP NZ iS NEZ	02 04 59.5 05 02.0					Local



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No.	Date 1959	Phase	Time (G.M.T.)	Per.	Amplitude			Remarks
					A _N	A _E	A _Z	
366	Nov. 22	eP Z eS NE iScS E i NEZ	<u>h. m. s.</u> 12 54 54.5 13 00 23.5 05 12.0 06 50.5	s.	<u>u</u>	<u>u</u>	<u>u</u>	H = 12 48 03 Δ = 3900 Km. USCGS: 3S 140E
367	22	eP Z eS NE	16 36 05.5 43 49.0					H = 16 26 28.5 Δ = 6200 Km. USCGS: 54S 136W
368	22	iP Z iS NEZ	19 40 49.5 45 45.0	1 5	+1.8	+3.6		Compression. H = 19 34 41 Δ = 3900 Km. USCGS: 21 $\frac{1}{2}$ S 178 $\frac{1}{2}$ W
369	23	iP NEZ	07 14 06.5					
370	23	eP Z	14 49 15.0					USCGS: $\frac{1}{2}$ S 128 $\frac{1}{2}$ E
371	23	eP Z	16 21 12.5					USCGS: 20S 174 $\frac{1}{2}$ E
372	26	iP NZ i Z	00 49 31.5 49 36.5					Compression. USCGS: 1 $\frac{1}{2}$ N 127 $\frac{1}{2}$ E
373	26	iP Z i Z ipP Z eS NE	07 15 21.5 15 28.5 15 35.5 22 24	2 8			+0.3 -2.2	Compression. H = 07 06 34.5 Δ = 5470 Km. USCGS: 5 $\frac{1}{2}$ S 102 $\frac{1}{2}$ E
374	26	eP EZ ipP Z eS NEZ i Z	23 18 24.0 18 39.0 25 23.0 21 48.0	10	+4.6	+5.4		H = 23 09 29 Δ = 5600 Km. USCGS: 5 $\frac{1}{2}$ S 103 E
375	28	iP NEZ iS NEZ	02 20 14.0 20 19.0					Local shock.
376	28	iP Z eS N eS E	02 52 11.0 57 23.0 57 26.0					Compression. H = 02 45 47 Δ = 3620 Km. USCGS: 19 $\frac{1}{2}$ S 174 $\frac{1}{2}$ E
377	28	eL NE	13 24.0					USCGS: 28 $\frac{1}{2}$ S 71W
378	28	iP NEZ e(S) N	22 45 39.5 50 37.0					Rarefaction. USCGS: 13S 167 $\frac{1}{2}$ E

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Milne Shaw Seismograph, E-W component,
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No.	Date 1959	Phase	Time (G.M.T.)	Per	Amplitude			Remarks
					A _N	A _E	A _Z	
			h. m. s.	s.				
379	Dec. 1	eP Z	15 05 19.5					H = 14 59 40.0
		eS E	09 54.0					Δ = 3000Km.
		e NE	10 13.0					USCGS: 63S 154E
380	1	iP Z	18 19 49.0					USCGS: 5N 125E
381	1	iP Z	19 01 29.5					USCGS: 9S 124½E
382	2	eP Z	07 38 49.0					USCGS: 5S 104E
383	2	iP NEZ	09 41 57.5					Compression.
		i(pP) NEZ	42 04.0	4	+1.5	-0.9	-2.4	H = 09 34 03.0
		iS NEZ	48 17.5	7	+4.5	-4.0	-3.5	Δ = 4730Km.
		eSS NEZ	51 21.5	12		+10.0	+10.0	USCGS: 1S 123E
384	2	e NZ	20 16 04.5					USCGS: 4½S 140E
385	7	iP NEZ	03 08 16.0					Rarefaction.
		i Z	08 24.0					USCGS: 18S 178W
386	8	iP NEZ	04 37 59.0					Rarefaction.
		e(SS) NE	47 23.0					USCGS: 1S 124E
387	9	i(P) NZ	01 30 02.5					
388	9	iP NEZ	14 11 19.0					Rarefaction.
		i Z	11 20.0					USCGS: 17S 177½W
		i Z	11 53.0					
389	9	iP Z	21 35 39.0					Rarefaction.
								USCGS: 5S 153E
390	10	eiP Z	01 11 50.5					
391	10	eL NE	03 09.1					
392	11	iP NEZ	00 38 43.5					USCGS: 5S 130E
		ipP NEZ	38 52.5					
393	11	iP Z	01 23 11.2					
394	11	eP Z	01 45 45.5					USCGS: 23S 175W

No.	Date 1959	Phase	Time (G.M.T.)	Per	Amplitude			Remarks
					A _N	A _E	A _Z	
			h. m. s.	s.				
395	Dec. 12	eP	Z	02 19 15.5				
396	12	eP	Z	03 38 48.0				
397	13	eP	Z	17 43 58.0				USCGS: 18S 173 $\frac{1}{2}$ W
398	14	iP	NEZ	18 06 48.5				H = 17 58 32
		i	Z	06 49.5				Δ = 5220Km.
		iP	NEZ	07 17.0				USCGS: 5 $\frac{1}{2}$ N 125 $\frac{1}{2}$ E
		iPcP	Z	08 21.0				
		i(pPP)	Z	09 08.0				
		eS	NE	13 27.0				
		isS	N	14 17.0				
		iScS	NE	16 27.0				
		eSS	NE	16 47.0				
		isSS	E	17 29.0				
399	14	iP	NEZ	21 57 11.0				
		i	NEZ	57 12.0				
		i(pP)	Z	57 23.0				
		i(PcP)	Z	59 02.5				
		i	Z	59 03.5				
400	14	iP	NEZ	23 34 22.0				Compression.
		i	Z	34 44.5				H = 23 22 05
		iPP	Z	37 26.5				Δ = 9060Km.
		eS	NE	44 29.5				USCGS: 59 $\frac{1}{2}$ S 31W
		iSKS	NEZ	44 35.5				
	15	iPKKP	Z	52 50.0				
		ePKPPKP	Z	00 00 54.5				
		i	Z	01 03.0				
		ePKPPKS	Z	04 18.5				
		ePKPPKPPKP	Z	21 11.5				
401	18	iP	NEZ	09 21 33.5				Rarefaction.
402	18	iP	NEZ	10 03 37.5				Rarefaction.
403	19	iP	EZ	09 16 22.0				Rarefaction.
404	20	iP	EZ	06 30 26.5				Rarefaction.
405	20	iP	EZ	08 11 52.5				Rarefaction.
								USCGS: South of Kermadec Is.
406	20	eP	Z	13 02 45.0				USCGS: 10 $\frac{1}{2}$ N 126 $\frac{1}{2}$ E
407	21	iP	EZ	10 27 22.0				Compression.
		i(PPP)	EZ	28 57.5				USCGS: 27 $\frac{1}{2}$ S 176W
		i	E	33 26.5				
408	21	iP	EZ	11 21 01.5				H = 11 14 14.5
		i(PP)	EZ	22 26.0				Δ = 3840Km.
		iS	E	26 26.5				USCGS: 27 $\frac{1}{2}$ S 176W
409	23	iP	Z	04 37 49.5				USCGS: 28S 176W
410	23	iP	Z	14 05 49.5				USCGS: 27 $\frac{1}{2}$ S 176W
411	24	iP	NEZ	03 30 21.0				Compression.
412	24	eP	Z	13 17 33.0				USCGS: 9N 126 $\frac{1}{2}$ E
		i	Z	17 39.5				
413	25	iP	NEZ	03 55 45.0				Rarefaction.
								USCGS: 27 $\frac{1}{2}$ S 176W
414	25	iP	NEZ	16 02 23.0				Compression.
		i	Z	02 42.0				
415	26	iP	Z	16 22 01.0				Rarefaction



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No.	Date 1959	Phase	Time (G.M.T.)	Per.	Amplitude			Remarks
					A _N	A _E	A _Z	
			h. m. s.	s.				
416	Dec. 26	e(P)	Z					USCGS: Kamchatka
417	27	eP	Z					USCGS: 52 $\frac{1}{2}$ N 160E
418	27	e(P)	Z					USCGS: 56N 162 $\frac{1}{2}$ E
		iS	NE					
419	28	eP	EZ					H = 07 20 36
		ipP	Z					Δ = 10320Km.
		iS	E					USCGS: 52 $\frac{1}{2}$ N 160E
		iS	N					
		ePPS	N					
420	29	eP	EZ					USCGS: 21 $\frac{1}{2}$ S 174W
421	29	iP	Z					Compression.
		i(pP)	Z					USCGS: 18N, 145E.
422	29	iP	NEZ					Compression.
		e(pP)	Z					H = 21 27 24
		eS	NZ					Δ = 4120Km.
		i(PcS)	NZ					USCGS: 8 $\frac{1}{2}$ S 122E
		e	Z					
423	30	eP	EZ					
424	31	iP	EZ					Rarefaction.
								USCGS: 3S 139 $\frac{1}{2}$ E

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