

RECORDS OF MILNE SEISMOGRAPH NO. 20, AT WELLINGTON, FROM OCTOBER, 1900, TO DECEMBER, 1901  
(INCLUSIVE).

598

PLATES XLI. AND XLII.

Latitude, 41° 17' S.; longitude, 174° 47' E. Time employed, 11 h. 30 m. east of Greenwich (New Zealand mean time). Mid-night, 0 h. or 24 h.; hours, 1 to 24.

Record numbers 1, 2, . . . from the 1st October, 1900. P.T., preliminary tremors. A.T., after-tremors. B., E., beginning and end of vibrations generally not less than 2 mm. Amp., full amplitude in millimetres.

The period of the boom of the pendulum during the currency of these records was kept as near to 16½ seconds as possible. The instrument is placed in a special room below a house standing about 30 ft. from the edge of a rocky cliff about 50 ft high, situated about 250 yards from the shore-line of Wellington Harbour.

GEORGE HOGGEN, Observer.

No.	Date.	P.T. (from)	B	Maxima		Amp.	E	A.T. (till)	Remarks.
				From	To				
1	1900. Oct. 3	13.17	?	17.41	..	Mm. 2	..	..	} Two maxima.
2	" 4	1.57	?	2.52½	20.40	6	?	22.45+	
3	" 4	8.51	9.51	9.52½	3.8½	1.5	?	8.16	} "
4	" 4	17.8	..	17.8	11.9	..	11.9	12.5	} "
5	" 5-6	23.57	2.48	2.56	..	small	..	8.5+	} Tremors; 5, 6, and 7 are continuous.
6	" 6	4.56	6.33½	6.35	..	..	3.4	4.50	
7	" 6	9.53	..	13.17	..	13	6.38	9.53+	
8	" 8	2.4	2.25	2.52	14.1	2	..	15.4	
9	" 8	6.42	8.54½	9.1	9.9	22	9.23	10.20	} Two maxima.
									} "

Appendix.

10	Oct.	8	12.17	..	..	..	..	..	13.50+	Minute tremors.	
11	"	8	..	20.7	20.37	..	7	20.49	21.37		
12	"	8	22.10	..	..	..	..	..	..		
	"	9	..	..	..	..	..	..	1.50		
13	"	9	2.50	..	..	..	..	..	8.4	"	
14	"	9	..	8.4	8.5 $\frac{1}{2}$	..	1.5	9.4	19.30+		
15	"	10	?	0.36	0.56	..	11	..	..	} Origin in Alaska.	
						2.17	8	2.43	?		
16	"	16	..	22.43	22.48 $\frac{1}{2}$	..	..	..	22.54 $\frac{1}{2}$	Small local shock.	
17	"	21	4.59	6.18	6.25	..	} 3.5	}	?	6.56	
					6.28 $\frac{1}{2}$	6.30					
18	"	22	12.7	..	..	..	..	..	16.31	Very small tremors.	
19	"	23	10.32	..	..	..	..	..	15.25	"	
20	Nov.	24	..	..	23.34	..	}	}	..	..	Nine small local shocks.
		25	..	..	..	..					
21	"	25	..	..	21.18 $\frac{1}{2}$	..	..	..	..	Small local shock.	
22	Dec.	16	..	11.37	12.29	..	9	13.25	..	Nine small shocks, one large.	
23		17	..	8.4	8.14	..	2.5	8.35	..	Five small shocks.	
24	"	17	..	11.53	12.14	..	5	12.53	..	Seven small shocks.	
25	"	18	..	8.28	9.15	..	4.5	9.26	..	Six small shocks.	
					9.57 $\frac{1}{2}$	10	38	..	18.37	Large tremors.	
26	"	19	..	9.55	10.6	..	10	10.56	21.54	Small tremors.	
					10.46 $\frac{1}{2}$	10.51	8	..	..		
27	"	23-24	5.55*	18.57	18.57	..	8	19.1	3.41+	Minute tremors for some hours after.	
28	"	24	10.25*	..	..	..	..	..	18.45*	Small tremors.	
29	"	25-26	18.30*	..	..	..	..	..	5.20*	Tremors.	
30	"	26-27	12.18	18.8	18.9	..	2.5	18.17	10.38	Many small shocks.	
31	"	27	11.42	..	..	..	..	..	12.57	Tremors.	
32	"	28	8.43	?	9.53 $\frac{1}{2}$	..	2	..	14.38	Slight; ? local.	
33	"	30-31	15.0*	..	..	..	..	..	5.30*	Tremors and slight shocks.	
		31	..	11.24	..	..	..	..	..	Centre line changing position.	
34	1901.	1	..	..	..	..	..	0.28	..	Wave in centre line (see record for January, 1901). No tremors or shocks.	
		Jan.	1	..	..	..	..	..	..	..	

Record defective for most of month of November owing to absence of observer.  
 Record incomplete during first part of December.

\*About.

RECORDS OF MILNE SEISMOGRAPH No. 20—continued.

No.	Date.	P.T. (from)	B.	Maxima		Amp.	E.	A.T. (till)	Remarks.	
				From	To					
35	1901. Jan.	1	..	..	..	..	..	..	Wave in centre line; period, 13 h. 4 m.; complete amplitude, 6.5 mm.	
36	"	2	19.34	..	22.33½	22.46½	3	22.53		23.25+
37	"	3	bef. 19.36	0.3	0.5½	..	2.5	0.7	..	Continuous tremors from 19.36 on the 3rd January to 16.34 on the 6th January.
38	"	4								
39	"	5	..	9.6½	9.13	..	2.5	9.19	16.34+	No. 39 is continuous with No. 40. Also smaller shocks at 1.7, 1.14, 1.43, 1.46½, 2.38, 2.46, 4.52, &c., with tremors between.
40	"	6	21.53	22.55½	23.0	23.26	..	..	..	
41	"	7	..	..	1.2	..	23.0	..	..	The tremors that had been going on for some days became more marked at 12.21½.
42	"	7	12.21½	12.43½	12.51	..	7.5	12.59½	..	
43	"	8	1.20	?	3.49	..	1	..	..	Followed by other maxima at 9.53 and 10.9½.
44	"	8	..	..	..	4.19	1	..	..	
45	Jan.	8	..	10.44	10.51	..	2	10.53	..	Followed by other maxima at 14.5, 14.14, 15.23, 15.44½, 16.3, 16.11, 17.0½.
46	"	8	..	12.38	12.51	..	1.5	12.55	..	
47	Jan.	8	..	?	21.33	..	3.5	?	..	? Local. Followed by other slighter shocks till 5.24, 9th January.
48	"	9	..	..	0.33	..	38	..	..	
49	"	9	..	..	..	4.57½	11	..	..	
50	Jan.	9	9.30	9.31	9.58½	..	4	..	..	Probably local.
51	"	9	..	..	10.10	..	2.5	..	..	
52	"	9	..	..	10.33	..	4	..	..	
53	"	9	..	..	11.5	..	7	..	..	
54	"	9	..	12.53	12.59	..	?	13.0½	..	With other smaller maxima,

Appendix.

47	Jan.	14	4.49	?	7.40 $\frac{1}{2}$	..	1	..	18.25	
48	"	15	10.32	..	..	..	..	..	17.48	Minute tremors.
49	"	16	..	..	..	..	..	..	?	Minute tremors till after 9.59, when lamp went out.
50	Feb.	4	10.30	..	18.30 $\frac{1}{2}$	..	5	..	..	Large tremors; no distinct earthquake.
51	"	5	..	..	..	..	..	..	7.39	
51	"	5	9.57	..	..	..	2.5	..	12.52	Tremors; no marked shocks.
52	"	5	21.41	..	..	..	..	..	..	Minute tremors.
52	"	6	..	..	..	..	..	..	6.18	
53	"	6	6.18	7.55 $\frac{1}{2}$	7.57 $\frac{1}{2}$	..	13.5	?	..	After-tremors of great length.
53	"	7	..	..	..	..	..	..	15.11	
54	"	8	7.42	..	..	..	..	..	18.34	Tremors.
55	"	10	..	7.13	7.13	..	7	7.14	..	Local.
56	"	10	..	8.32	8.33	..	4.5	8.33 $\frac{1}{2}$	..	"
57	"	10	..	9.32	9.36	..	2	9.36	..	"
58	"	10	..	14.31	14.32	..	2.5	14.32	..	Local; tilt 2 mm. to west.
59	"	10	..	15.42	15.42	..	3	15.42	..	Local; tilt 1.5 mm. to east.
60	"	19	..	16.29 $\frac{1}{2}$	16.34	..	16	16.36 $\frac{1}{2}$	..	Local.
61	"	10	..	19.5	19.5	..	6	19.5	..	Local; tilt 2 mm. to east.
62	"	10	..	19.28	19.33	..	3	19.34 $\frac{1}{2}$	..	Local.
63	"	10	..	?	22.48 $\frac{1}{2}$	22.53	3.5	?	..	Local; tilt 0.5 mm. east.
64	"	10	..	23.29	23.36 $\frac{1}{2}$	..	5	23.39	..	
65	"	11-14	..	..	..	..	..	..	..	A few minute tremors.
66	"	20	2.44	3.15	3.18	..	1	3.19	3.23	Local.
67	March	15	..	?	23.17	..	?	?	..	Very small; local.
68	"	16	..	?	21.37	..	4	?	..	Change of level; local.
69	"	19	..	?	3.21	..	1	?	..	Local.
70	"	23	..	?	16.35	..	?	?	..	Very small; local.
71	April	30	..	4.42	4.42	..	5	4.42 $\frac{1}{2}$	..	Local.
72	"	30	..	4.59	4.59	5.0	4	5.0 $\frac{1}{2}$	..	Local; two maxima.
73	"	30	..	5.17	5.17	..	29	5.17 $\frac{1}{2}$	?	Local; tilt 4 mm. to west; after-tremors for nineteen hours.

Record defective for first ten days of April; clock out of order. Again from 17th to 25th April; clock out of order.

RECORDS OF MILNE SEISMOGRAPH NO. 20—continued.

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No.	Date.	P T (from)	B.	Maxima		Amp.	E.	A T (till)	Remarks.
				From	To				
	1901.					Mm.			
74	May 3	10.52	..	..	..	..	..	21.20	Very small tremors.
75	" 4	5 20	9 39	9.40 $\frac{1}{2}$	..	4	9.43	..	Continuous tremors between; followed by minute tremors.
76	" 4	..	15.47	15.53	..	3	15.59	16.24	
77	" 5	1.33	..	..	..	..	..	..	Large tremors from 12.45 to 13.50; rest small or minute tremors.
	" 6	..	..	..	..	..	..	0 6	
78	" 6	4.15*	..	..	..	..	..	18.15*	Very small tremors.
79	" 7	1.11	..	..	..	..	..	17.47	Small to very small tremors.
80	" 8	5.33	..	..	..	..	..	12.15	Very small tremors, followed by minute tremors till 15.25.
81	" 9	10.33	..	..	..	..	..	20.30	Very small tremors.
82	" 9	21.17	..	..	..	..	..	..	Tremors gradually increasing from minute to moderate (1 or 1.5 mm).
	" 10	..	..	..	..	..	..	8.30*	
	" 10	8.32	9.26	9.26 $\frac{3}{4}$	..	1.5	..	..	10-11 May: chief maxima, as named.
	" 10	..	..	10.45 $\frac{1}{2}$	..	3.5	..	..	Also at 10.54 $\frac{1}{2}$ (2.5 mm.), 10.57 $\frac{1}{2}$ (2.5 mm.).
	" 10	..	..	11.27 $\frac{1}{2}$	..	3 75	..	..	Also at 12.13 (2 mm.), 13.3 (3 mm.), 14 36 $\frac{1}{2}$ (2 mm.).
	" 10	..	..	17.6 $\frac{1}{2}$	..	3 5	..	..	
83	" 10	..	..	17.47	17.50 $\frac{1}{2}$	3	..	..	Also at 19.17-19.26 $\frac{1}{2}$ (2.5 mm.) and 19.58 (2.5 mm.).
	" 10	..	20.15 $\frac{1}{2}$	20 47	..	5	..	..	Also at 22 6, 22.24, and 22.32 (all 3 mm.).
	" 10	..	22.52 $\frac{1}{2}$	22 54 $\frac{1}{2}$	23.61 $\frac{1}{2}$	4.75	..	..	Also at 0.10, 0.13, 0 13 $\frac{1}{2}$ (all 2.5 mm.).
	" 11	..	0.42	0.48	0.51	3.75	0.57	3.29	
84	" 11	3.54	..	..	..	..	..	11.53	Very small tremors.
85	" 11	..	19.24	19.27	..	1	19.28	..	? Local.
86	" 12	..	1 48	1.48	2.6	3	2 6	..	Probably local.
87	" 13	2.38	2.51	2.51	..	2	2.51	..	? Local.

Appendix.

88	May	17	..	15.36	15.36	..	?	15.36	..	} Very small local shocks.
89	"	17	..	22.30	22.30	..	?	22.30	..	
90	"	18	0.30	..	..	..	..	..	10.32	} Tremors, minute, with a few moderate Minute tremors.
91	"	19	5 15	..	..	..	..	..	15.12	
92	"	22	5.28	..	..	..	..	..	19.24 $\frac{1}{2}$	} Local; level tilted 4 mm. to west. Very small tremors.
93	June	6	..	..	13 26	..	..	..	20.42	
94	"	6	18.11	..	..	..	..	..	..	} Minute tremors.
95	"	6	20 52	..	..	..	..	..	..	
95	"	7	..	..	..	..	..	..	4.11	} Local.
96	"	10	..	17.49	17 51	..	5	17.53	..	
97	"	11	..	2.32 $\frac{1}{2}$	2.34	..	4	2.37	..	} Fifteen shocks, or maxima; eighteen similar shocks of shorter duration, till about 2.45 on the 29th June.
98	"	27	?	22.47	22 47	23.51	2-3	23 54	..	
99	"	29	..	13.48	13.51	14.2	6	14.6	..	Local.
100	"	29	..	14.29 $\frac{1}{2}$	14.30	14.32 $\frac{1}{2}$	..	14.37	..	? Local.
101	"	29	..	15 53	16 2	..	..	16 27	..	} "
102	"	29	..	17.31 $\frac{1}{2}$	17.31 $\frac{1}{2}$	..	7	17.49	..	
103	"	29	..	18 43	18 51	..	5	18.56	..	} "
104	"	29-30	..	23.35	23.45	23.57	4	0.1	..	
105	"	30	..	0.54	0.54	1	7	1.6	..	} "
106	"	30	..	3.41 $\frac{1}{2}$	3.42	..	4	3.49	..	
107	"	30	..	10.49	10.55	..	6	11 5	..	} "
108	"	30	..	12 54	12 56	13.5	3	13 8	..	
109	"	30	..	13 40	13.40	13.41	4	13 45	..	} "
110	"	30	..	18 1	18 6	..	5-5	18.9	..	
111	"	30	..	21.26	21.26	21.47	4	21.52	..	} "
112	"	30	..	23 3	23.3 $\frac{1}{2}$	..	10	23.28	..	
113	July	1	..	1.30	..	..	..	22 45	..	} Eleven shocks similar to those of 29th June, but shorter.
114	"	3	10 46	..	..	..	..	..	14 22	
115	"	4	6.37	..	..	..	..	..	17.38	} Small tremors.
116	"	19	21.19	..	..	..	..	..	23 34	
117	"	21	6.9	..	..	..	..	..	14.13	} Very small tremors. Tremors, minute for about seven hours, then small.

\* About.

It is possible, but not likely, that some of the shocks from the 27th to the 30th June may be instrumental.

RECORDS OF MILNE SEISMOGRAPH No. 20—continued.

No.	Date	P.T. (from)	B.	Maxima.		Amp.	E.	A.T. (till)	Remarks.
				From	To				
	1901.					Mm.			
118	July 25	9.37	..	..	..	..	..	19.45*	Minute tremors.
119	" 26	6.30*	..	..	..	..	..	8.25*	"
120	" 29	22.6	..	..	..	..	..	..	Tremors.
121	" 30	..	..	..	..	..	..	6.24	"
121	" 30	10.39	..	..	..	..	..	14.43	"
122	" 30	15.39	22.0	22.4	22.6	3.5	?	..	"
122	" 31	..	..	..	..	..	..	13.25	"
123	Aug. 2	2.14	..	..	..	..	..	9.47	Small tremors.
124	" 2	15.36	..	..	..	..	..	..	"
124	" 3	..	..	..	..	..	..	19.24	"
125	" 4	3.20	..	..	..	..	..	..	Very small tremors, with intervals of rest.
125	" 5	..	..	..	..	..	..	0.55	"
126	" 6	19.48	..	..	..	..	..	19.55	Tremors.
127	" 9	21.8	21.35	22.4	..	6	22.12	23.6	"
128	" 10	..	0.38	0.51	1.25†	>40	2.46	?	"
129	" 10	?	3.36	3.44	4.10	5	4.17	5.4	"
130	" 10	6.0	6.44	7.11	7.23	4	7.26	9.20+	"
131	" 10	21.59	22.18	22.23	22.33	6	22.38	23.43	"
132	" 11	3.33	3.34	3.35‡	3.39	2	3.42	..	Probably local.
133	" 11	6.22	..	..	..	..	..	6.35	Tremors.
134	" 11	9.12	..	..	..	..	..	9.26	"
135	" 11	17.34	..	..	..	..	..	22.28	Minute tremors.
136	" 12	1.36	2.7	2.12	2.24	11	2.40	4.4	"
137	" 13	7.37	..	..	..	..	..	7.52‡	Small tremors.
138	" 13	21.5	..	..	..	..	..	..	Tremors, large and small.
138	" 14	..	..	..	..	..	..	14.48	"
139	" 14	18.10	..	..	..	..	..	18.41	Small tremors.
140	" 14	20.37	..	..	..	..	..	..	Tremors, moderate to minute.
140	" 15	..	..	..	..	..	..	23.8	"

141	Aug.	16	8.40	..	..	..	..	..	9.34	Minute tremors.
142	"	16	20.37	..	..	..	..	..	21.11	Tremors.
143	"	17	7.45	..	..	..	..	..	..	Minute tremors, dying away slowly.
	"	18	..	..	..	..	..	..	6.41	
144	"	19	7.38	..	..	..	..	..	..	Minute for 25½ hours, then moderate to large.
	"	20	..	..	..	..	..	..	20.46	
145	"	20	21.6	..	..	..	..	..	..	Tremors.
	"	21	..	..	..	..	..	..	6.2	
146	"	21	18 43	..	..	..	..	..	..	"
	"	23	..	..	..	..	..	..	21.49	
147	"	25	..	9.11	9.11	..	3	9.11½	..	? Local.
148	"	25	..	9.35	9.36	..	11	9.36½	..	Two maxima.
149	"	25	..	10.41	10.41	..	26	10 43	..	
	"	28	4.37	..	..	..	..	..	..	Long series of vibrations.
150	"	29	..	?	9.24	..	..	..	..	
	"	30	..	..	..	1.28	2-3	..	17 0	
151	Sept.	4	8.15	..	..	..	..	..	..	Minute tremors, with intervals of rest.
	"	5	..	..	..	..	..	..	19.1	
152	"	6	8 4	..	..	..	..	..	19.4	"
153	"	7	19.7	..	..	..	..	..	21.37	
154	"	8	10.30	10 38	10.41	10.45	4	11.0½	11.18	After-tremors, many large, with intervals of rest.
155	"	9	5 19	5.31	5.32	5.33½	16	5 36	..	
	"	10	..	..	..	..	..	..	19.20	
156	"	10	20.44	..	..	..	..	..	..	Tremors, minute at first.
	"	11	..	..	..	..	..	..	5.2	
157	"	11	8.43	..	..	..	..	..	9.14	Very small tremors.
158	Oct.	19	..	9.21	9.21	9.33	1.5	9.34	..	
										Three maxima. ? Local.
										Local. Earthquake in Cheviot district, Canterbury and Nelson. Large tremors till 8.58, followed by continuous small tremors (with very few intervals) and many small shocks until 17 h. on the 19th November, with intensity IX. on Rossi-Foré scale.
159	Nov.	16	..	7.47	7.47½	7.49½	> 40	7.58½	8.58	Very small or minute.
	"	19	..	..	..	..	..	..	17.0	
160	"	20	10 30*	..	..	..	..	..	19.0*	

The clock was out of order and was away for repairs during part of October.

\* About.

† Other maxima or large tremors up to 10 mm. in amplitude for more than one hour later



## RECORDS OF MILNE SEISMOGRAPH NO. 20.—continued.

No.	Date	P.T. (from)	B.	Maxima		Amp.	E.	A T (till)	Remarks.	
				From	To					
	1901.					Mm.				
161	Nov.	21	6.20*	?	11.18½	..	1	?	..	Tremors; local.
		22	..	..	..	..	..	..	0.20	
162	"	23	2.45*	..	..	..	..	..	..	Minute to small tremors.
		25	..	..	..	..	..	..	..	
163	"	25	13.32	13.50	13.53	13.56	8	14.2	14.56	Probably non-local.
164	"	25	19.25	..	..	..	..	..	..	Tremors; probably local.
		26	..	..	..	..	..	..	13.20	
165	"	27	7.35	..	..	..	..	..	18.20	"
166	"	28	2.37	?	7.44½	†8.29¾	2.5	..	17.3	"
167	"	29	3.50	..	..	..	..	..	11.40	Moderate.
		30	..	..	..	..	..	..	18.18	Minute.
168	Dec.	31	20.4	..	..	..	..	..	..	Very small tremors.
		1	..	..	..	..	..	..	8.47	
169	"	1	..	..	8.52½	..	2	8.58½	..	Tremors between.
170	"	1	?	9.46	9.48½	..	8	9.51	..	
171	"	22	..	1.34	1.34	..	1	1.38	..	Local.
172	"	23	..	6.15¾	6.16¾	..	2.5	6.19½	..	"
173	"	23	..	8.26½	8.26½	..	2.5	8.29½	..	"
174	"	24	..	7.7½	7.7½	..	1	7.9	..	? Local.
175	"	25	..	11.21	11.47¾	..	3	11.51½	..	"
176	"	25	..	14.45	14.45	..	3.5	14.47½	..	Local.
177	"	26	14.9	..	14.41	..	..	..	14.44	Minute tremors.
178	"	26	21.38	21.40½	21.44½	21.49½	6.5	22.7	23.14¾	"
179	"	27	10.4	..	..	..	..	..	12.10	"
180	"	27	..	21.53½	21.53½	..	4	21.57	..	Local.
181	"	28	5.0	..	14.6¾	..	2	..	20.7½	Tremors, mostly minute or very small.
182	"	31	20.56	21.21¼	21.25¾	..	2	21.28½	21.38	

Many minute tremors and small shocks separated by longer intervals from 1st to 22nd December; probably all local (Cheviot).

\*About. †Other maxima till 11.4. Tremors marked but small, dying away to minute.