

## EARTHQUAKES.

In April, 1903, a Milne seismograph belonging to the seismological committee of the British Association was transferred from Oahu College to the magnetic observatory. The pendulum points north, thus recording east-west motion. The period of the pendulum was kept between 19 and 20 seconds. The sensitiveness, i. e., the amount of tilt corresponding to a displacement of 1 mm. in the end of the pendulum, was determined at various times as follows:

1911	"	1912	"
February 18.....	0. 25	February 2.....	0. 28
April 15.....	0. 33	April 14.....	0. 28
June 17.....	0. 39	June 15.....	0. 42
August 16.....	0. 47	September 16.....	0. 43
October 16.....	0. 38	November 18.....	0. 46
December 16.....	0. 31	December 7.....	0. 42

In the following table the times of the phases are given in Greenwich mean time counted from midnight. It will be seen that a great many of the recorded disturbances are tremors of short duration and small amplitude, in many cases a mere swelling of the line, without well-defined phases, and the beginning has been tabulated as the beginning of the principal portion.

### Register of earthquakes.

No.	Date	First P. T. begin		Large waves begin		Maximum		End	Maximum amplitude	Remarks
		<i>h</i>	<i>m</i>	<i>h</i>	<i>m</i>	<i>h</i>	<i>m</i>			
	1911								<i>mm</i>	
834	Jan. 1	11	03.5	11	19.2	11	23.2	12 11	0.4	Second P. T. at 11:09.8.
835	1	..	..	19	20.8	19	23.1	19 30	0.4	Tremor.
836	2	..	..	19	09.4	19	12.6	19 18	0.5	Do.
837	2	..	..	23	12.8	23	17.0	24 24	3.5	Second P. T. at 23:05.5.
838	3	..	..	3	44.8	3	47.1	.. ..	0.2	Tremor.
839	3	23	40.1	{ 23 57.6	}	24 24.6	}	28 13	7.6	Second P. T. at 23:50.5.
840	4	..	..	24 11.6		9 02.1		9 08	0.4	Tremor.
841	7	2	25.3	2	44.0	2	49.6	4 04	1.7	Second P. T. at 2:32.9.
842	10	16	42.7	16	52.4	16	55.0	17 41	1.2	Second P. T. at 16:47.7.
843	16	9	16.0	9	32.4	9	34.5	10 00	0.5	Tremors.
844	17	..	..	1	41.1	1	42.0	1 48	0.4	Tremor.
845	30	..	..	3	34.8	3	37.8	3 42	0.2	Do.
846	Feb. 5	..	..	4	42.3	4	55.4	5 00	0.2	Do.
847	9	..	..	7	37.1	7	39.4	7 46	0.2	Do.
848	17	..	..	10	19.2	10	35.9	11 06	0.2	Do.
849	18	..	..	19	27.9	19	33.9	22 57	2.0	Second P. T. at 19:15.1.
850	19	..	..	3	08.6	3	09.8	3 32	0.2	Tremors.
851	19	..	..	6	30.0	6	32.0	6 36	0.2	Tremor.
852	20	..	..	20	17.2	20	17.4	20 26	0.2	Do.
853	23	11	34.6	11	49.7	11	52.0	12 22	0.5	Second P. T. at 11:39.0.
854	26	..	..	13	50.5	13	52.8	14 00	0.2	Tremor.
855	Mar. 5	..	..	4	35.0	4	37.0	4 39	0.2	Do.
856	6	..	..	18	04.7	18	11.2	18 20	0.2	Do.
857	11	3	25.2	3	40.8	3	47.0	4 48	1.5	Second P. T. at 3:33.3.
858	13	14	41.8	15	00.4	15	03.0	.. ..	0.5	Second P. T. at 14:50.5.
859	19	..	..	4	43.0	5	00.0	5 06	0.2	Tremor.
860	27	..	..	16	26.0	16	28.0	16 31	0.1	Do.
861	Apr. 1	..	..	0	31.0	0	31.3	0 37	0.2	Do.
862	1	2	13.0	2	20.0	2	20.3	2 49	0.2	Second P. T. at 2:16.2.
863	2	..	..	7	23.0	7	23.5	7 26	0.2	Tremor.
864	6	..	..	9	59.5	10	01.5	10 09	0.2	Do.
865	7	6	51.4	7	03.8	7	08.4	8 11	2.2	Second P. T. at 6:57.4.
866	8	..	..	1	29.6	1	31.8	1 36	0.3	Tremor.
867	10	18	55.5	..	..	..	..	20 19	..	Second P. T. at 19:06.0.
868	11	..	..	13	47.8	14	00.8	14 02	0.3	Tremor.
869	15	..	..	5	29.2	5	38.5	5 46	0.2	Do.
870	17	..	..	5	22.6	5	26.5	5 36	0.2	Do.
871	18	..	..	6	25.7	6	28.5	6 33	0.2	Do.
872	18	17	46.0	18	15.0	18	16.5	.. ..	0.7	Second P. T. at 17:54.7.
873	21	..	..	2	42.0	2	44.4	2 48	0.3	Tremor.
874	22	..	..	18	58.4	19	01.8	19 03	0.5	Do.
875	26	..	..	1	31.0	1	32.5	1 34	0.2	Do.
876	28	10	04.5	10	15.2	10	15.3	11 31	0.3	Second P. T. at 10:13.4.
877	28	18	51.5	18	58.0	18	58.5	19 14	0.4	Second P. T. at 18:54.7.

## Register of earthquakes—Continued.

No.	Date	First P. T. begin		Large waves begin		Maximum		End	Maximum amplitude	Remarks	
		<i>h</i>	<i>m</i>	<i>h</i>	<i>m</i>	<i>h</i>	<i>m</i>				<i>h</i>
	1911										
878	Apr. 30	..	....	4	48.5	4	52.1	5	00	0.4	Second P. T. at 4:40.8.
879	May 3	17	22.5	17	33.0	17	36.3	17	38	0.2	
880	4	13	53.5	14	14.6	14	22.2	14	34	0.2	
881	4	23	46.5	23	56.5	24	05.4	27	27	4.5	Second P. T. at 23:52.6.
882	9	..	....	19	59.3	20	00.1	20	07	0.1	Tremor.
883	10	..	....	0	36.7	0	39.0	0	44	0.4	Do.
884	11	4	18.2	5	06.5	5	12.2	6	19	0.7	Second P. T. at 4:38.1.
885	11	..	....	15	42.3	15	45.0	15	52	0.2	Tremor.
886	12	..	....	13	23.0	13	24.0	13	29	0.1	Do.
887	June 3	20	38.2	20	47.0	20	50.6	23	12	3.6	Second P. T. at 20:44.0.
888	5	..	....	1	16.0	1	20.0	1	22	0.2	Tremor.
889	5	..	....	3	23.3	3	28.0	3	36	0.5	Do.
890	6	..	....	13	09.0	13	13.0	13	16	0.2	Do.
891	7	11	05.2	11	19.0	11	29.0	15	03	25+	Second P. T. at 11:11.2.
892	8	0	56.0	1	03.9	1	08.5	1	16	0.4	Tremor.
893	15	14	37.1	14	46.0	14	59.7	18	26	17.0	
894	17	5	32.0	5	47.0	5	54.6	6	16	1.2	Second P. T. at 5:38.7.
895	24	..	....	16	03.0	16	07.7	16	14	0.3	Tremor.
896	25	..	....	10	10.3	10	12.3	10	30	0.1	Do.
897	28	7	25.7	7	44.8	7	47.9	7	58	0.5	Second P. T. at 7:33.0.
898	28	..	....	16	31.0	16	32.5	16	35	0.1	Tremor.
899	28	20	04.3	20	21.5	20	25.0	21	00	1.9	Second P. T. at 20:11.2.
900	July 1	22	14.0	22	14.4	22	15.4	23	25	0.8	
901	3	..	....	19	03.0	19	10.0	19	15	0.1	Tremor.
902	3	..	....	22	24.0	22	27.5	22	48	0.2	Do.
903	4	13	53.0	14	07.7	14	40.4	15	36	0.7	Second P. T. at 13:58.8.
904	5	2	56.0	3	13.0	3	13.4	3	44	0.2	Series of small tremors.
905	5	18	50.4	19	04.8	19	05.8	19	14	0.2	Tremor.
906	11	21	31.0	21	42.7	21	43.7	22	30	0.6	Second P. T. at 21:37.8.
907	12	4	20.4	4	41.0	4	45.2	9	40	8.5	Second P. T. at 4:28.8.
908	13	9	13.0	9	19.0	9	22.6	9	28	0.3	Tremor.
909	14	..	....	2	05.0	2	34.4	2	45	0.1	Series of small tremors.
910	14	..	....	22	05.5	22	06.4	22	51	6.2	Local shock.
911	19	..	....	10	18.0	10	25.1	11	14	0.4	
912	19	20	31.6	..	....	20	59.0	22	22	0.2	
913	23	17	13.0	17	41.8	17	54.6	18	33	0.5	
914	25	4	02.8	4	26.9	4	30.0	4	58	0.5	Second P. T. at 4:19.0.
915	29	9	55.0	10	12.2	10	15.2	10	37	0.5	
916	30	..	....	14	21.5	14	24.0	14	29	0.1	Slight broadening of line.
917	Aug. 6	..	....	1	40.0	1	44.0	1	49	0.1	Do.
918	8	..	....	14	53.0	14	59.0	15	23	0.1	Do.
919	9	..	....	6	14.1	6	18.0	6	25	0.3	
920	10	0	31.0	0	44.0	0	47.0	0	55	0.3	Tremor.
921	14	..	....	19	14.3	19	17.5	19	22	0.2	Do.
922	16	..	....	5	28.4	5	32.0	5	36	0.2	Do.
923	16	22	52.9	23	10.2	23	16.5	26	59	25+	Second P. T. 23:01.6.
924	18	2	23.8	..	....	3	31.8	3	53	0.2	Series of small tremors.
925	21	16	37.8	16	44.0	16	49.0	17	53	4.0	
926	27	..	....	11	17.4	11	18.4	11	41	0.2	Tremor.
927	29	..	....	7	21.0	7	23.0	7	32	0.1	Broadening of line.
928	Sept. 6	1	04.0	1	10.1	1	10.2	1	52	0.5	
929	8	..	....	23	01.3	23	15.0	23	30	0.4	Do.
930	12	13	08.8	13	19.0	13	22.5	13	50	0.5	Sec. P. T. at 13:14.0.
931	13	3	16.5	3	18.7	3	20.0	3	30	0.4	Tremor.
932	15	13	33.5	3	56.0	3	59.0	15	48	1.1	
933	17	3	37.0	3	42.5	3	46.2	7	30	3.5	Second P. T. 3:40.8.
934	20	4	51.5	5	16.2	5	21.0	6	03	0.3	Tremor.
935	21	7	34.0	7	40.5	7	42.5	8	25	0.3	Do.
936	22	5	14.0	5	17.3	5	19.6	6	30	0.6	
937	24	..	....	4	30.9	4	37.2	4	52	0.1	Series of small tremors.
938	25	8	18.6	8	34.0	8	35.0	9	04	0.3	Do.
939	Oct. 6	..	....	16	02.0	16	05.5	16	15	0.2	Broadening of line.
940	10	13	33.9	13	46.0	13	50.2	15	00	0.9	Second P. T. 13:38.8.
941	13	2	42.0	2	55.8	3	01.5	5	08	4.5	Second P. T. 2:48.5.
942	13	..	....	9	49.5	9	54.0	9	57	0.1	Broadening of line.
943	13	..	....	15	57.5	16	11.0	16	15	0.1	Do.
944	14	..	....	5	18.1	5	24.5	5	30	0.1	Do.
945	14	6	25.6	6	32.2	6	37.2	7	21	0.9	
946	14	12	36.0	12	47.9	12	53.0	14	10	3.2	Second P. T. 12:40.8.
947	14	16	48.0	16	49.7	16	51.4	17	..	1.0	
948	14	..	....	23	52.0	24	29.0	25	15	0.3	

Remarks



## Register of earthquakes—Continued.

No.	Date	First P. T. begin	Large waves begin	Maximum	End	Maximum amplitude	Remarks
		<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>mm.</i>	
949	1911 Oct. 15	12 04.7	12 11.0	12 17.5	12 45	0.9	
950	15	.. .. .	23 51.2	23 57.0	24 05	0.4	
951	17	9 29.0	9 46.2	9 51.8	10 48	2.5	Second P. T. 9:37.2.
952	17	12 08.0	12 15.1	12 20.0	13 17	1.0	
953	20	.. .. .	18 01.0	18 14.6	.. .. .	1.2	
954	24	0 31.8	0 47.0	0 57.7	1 28	0.3	
955	26	14 35.8	14 51.0	14 57.0	15 06	0.2	Tremor.
956	27	23 08.0	23 12.0	23 14.0	23 20	0.1	Do.
957	29	18 27.0	18 33.5	18 37.2	?	1.0	End obscured by air tremors.
958	Nov. 1	.. .. .	4 14.0	4 16.0	4 19	0.2	Possibly artificial.
959	1	9 46.6	9 57.9	10 02.0	11 05	0.4	
960	8	14 29.8	14 44.0	15 01.0	15 30	0.4	Series of small tremors.
961	9	4 32.0	4 50.7	4 54.2	5 35	1.0	
962	9	9 34.0	9 39.5	9 44.5	9 57	0.2	Broadening of trace.
963	13	16 20.0	16 28.5	17 05.0	18 00	1.1	
964	16	11 48.2	11 57.0	12 00.7	12 31	1.0	
965	18	.. .. .	3 35.0	3 39.0	4 02	0.3	Tremor.
966	18	7 50.6	7 59.3	8 02.0	8 43	0.8	
967	19	.. .. .	13 42.7	13 46.0	13 51	0.2	Do.
968	20	14 08.3	14 20.0	14 27.0	14 55	0.2	Series of small tremors.
969	22	23 14.4	23 20.9	23 25.9	24 30	1.0	
970	25	.. .. .	19 52.0	19 55.0	19 59	0.1	Broadening of line.
971	28	16 01.8	16 13.4	16 19.2	.. .. .	2.3	End obscured by air tremors.
972	29	.. .. .	5 11.7	5 18.5	5 37	0.6	
973	Dec. 6	23 25.5	23 43.6	23 48.5	25 15	0.5	
974	10	.. .. .	3 46.8	3 49.5	4 04	0.1	Broadening of line.
975	11	11 34.7	11 54.5	12 04.2	12 53	0.6	Second P. T. 11:46.9.
976	13	22 50.5	23 02.2	23 07.3	24 10	0.9	
977	16	19 23.8	19 39.5	19 42.1	23 22	11.7	Second P. T. 19:31.7.
978	20	5 48.4	6 04.9	6 10.3	7 47	5.0	Second P. T. 5:58.0.
979	20	.. .. .	14 50.0	14 55.0	15 03	0.2	Tremor.
980	23	.. .. .	21 37.4	21 41.0	22 30	0.9	Beginning obscured by air tremors.
981	25	7 22.3	7 25.5	7 26.3	7 50	0.2	
982	25	.. .. .	15 55.0	16 00.0	16 24	0.1	Broadening of line.
983	29	15 42.5	15 46.5	15 51.0	16 56	1.5	Second P. T. 15:45.5.
984	30	9 27.0	9 40.0	9 47.8	10 11	0.4	Tremor.
985	31	6 28.0	6 39.0	6 46.7	9 10	1.6	
986	31	14 35.6	14 39.0	14 41.0	14 48	0.2	Do.
987	1912 Jan. 4	15 55.5	16 00.8	16 06.6	.. .. .	5.0	Second P. T. at 15:59.3?
988	16	0 09.6	0 15.2	0 17.0	0 50	0.1	Very small tremors.
989	18	.. .. .	5 57.7	5 58.6	6 00	.. .. .	
990	20	4 10.1	4 27.5	4 33.7	5 30	2.5	Second P. T. at 4:18.2.
991	20	.. .. .	8 49.7	8 56.3	9 10	0.4	
992	23	.. .. .	19 28.8	19 32.0	20 08	0.3	
993	30	.. .. .	23 40.0	23 44.5	23 55	0.1	
994	31	20 25.7	20 28.6	20 30.5	22 00	4.2	
995	Feb. 3	.. .. .	7 44.5	7 45.7	7 49	0.1	
996	11	23 21.0	23 30.2	23 32.4	23 38	0.3	
997	16	9 43.7	9 52.9	10 00.9	10 57	1.5	
998	25	2 56.9	3 03.8	3 07.4	3 26	0.4	Second P. T. at 3:00.0.
999	25	.. .. .	21 16.0	21 23.6	21 33	0.3	
1000	29	.. .. .	1 24.0	1 29.4	1 33	0.2	
1001	29	3 32.0	3 42.9	3 44.0	3 51	0.2	Second P. T. at 3:36.4.
1002	Mar. 11	10 30.6	10 32.7	10 34.6	11 47	1.0	Not far distant.
1003	13	19 26.5	19 35.5	19 39.8	20 04	0.5	Second P. T. at 19:31.5.
1004	14	6 45.7	7 04.1	7 07.2	7 23	0.1	
1005	16	13 28.8	13 31.4	13 32.4	14 23	1.0	
1006	16	.. .. .	15 05.9	15 06.7	15 18	0.4	
1007	20	.. .. .	20 03.7	.. .. .	20 16	0.1	Merely a widening of line.
1008	22	.. .. .	5 07.0	5 13.0	5 28	0.3	
1009	24	.. .. .	13 13.0	13 19.0	13 28	0.1	
1010	25	4 57.9	5 10.8	5 11.4	5 59	0.6	Second P. T. at 5:06.8.
1011	29	.. .. .	14 12.0	.. .. .	14 18	0.1	Very slight tremors.
1012	30	8 04.2	8 14.4	8 20.4	8 40	0.2	
1013	Apr. 14	.. .. .	13 45.5	13 48.4	13 56	0.2	Very slight. Phases not well marked.
1014	14	22 48.8	22 58.6	23 02.7	23 40	1.4	
1015	15	16 11.0	16 32.8	16 37.0	17 00	0.5	Second P. T. at 16:21.8.

