26. *Seismometrical Report.*

地震觀測報告

(Earthquake Research Institute, Tôkyô, Japan.)

(January 1—March 31, 1931.)

Introduction.

The object of this new column is to report all earthquakes that have been felt without instrumental aid as registered at stations in the seismic network framed over the Kwantô districts by the Earthquake Research Institute of the Tôkyô Imperial University. In the case of important earthquakes, their seismograms will be reproduced, while, as of possible aid to international co-operation, distant earthquakes will also be reported.

As shown in List I, there are eight permanent seismological stations in the Kwantô district, and these will supply us with the necessary data. Data from such temporary stations as Wakayama and Idu will not be reported.

(1) *Seismological stations in the Kwantô districts.*

List I.

Station	Coordinates		Approximate distance from Tôkyô (Hongô)
	Longitude (E)	Latitude (N)	
Tôkyô (Hongô)	139° 45′ 59″	35° 42′ 40″	0 km.
Kamakura	139° 32′ 39″	35° 18′ 32″	48
Kiyosumi	140° 09′ 02″	35° 09′ 22″	70
Misaki	139° 37′ 05″	35° 09′ 26″	62
Titibu	139° 04′ 54″	35° 58′ 56″	69
Tôgane	140° 21′ 38″	35° 34′ 00″	55
Tukuba	140° 06′ 36″	36° 12′ 39″	64
Mitaka	139° 32′ 32″	35° 40′ 20″	20

(2) *Instruments.*

List II.

(A) Tôkyô (Hongô).

No.	Name or type component	Weight of the bob (kg.)	Magnification or minification	Natural period (sec.)	Damping ratio	Time scale mm./min.	Remarks
1	(E.W.)	2	1/2	10	2·0	50	With oil damper.
	(N.S.)	2	1/2	10	2·0		
	(Vert.)	1	1/2	6	2·0		
2	(E.W.)	2	2	10	2·5	40	With oil damper.
	(N.S.)	2	2	10	2·5		
	(Vert.)	0·45	2	5	2·0		
3	(E.W.)	15	$1\frac{1}{2}$	50	1 5		With oil damper.
	(N.S.)	15	$1\frac{1}{2}$	50	1·5		
4	(E.W.)	7	50	7	1·3	60	
	(N.S.)	7	50	7	1·3		
5	(E.W.)	7	50	7	1·5	50	With magnetic damper.
	(N.S.)	7	50	7	1·5		
	(Vert.)	7	28	7	1·5		
6	(E.W.)	30	300	12	1·7	100	
7	(N.S.)	30	300	12	1·7	100	
8	(E.W.)	15	15	50	2·0	15	
9	(N.S.)	15	10	50	2·0	25	
10	(N.S.)	30	120	18	2.0	60	
11	Wiechert (E.W.N.S.)	200	120	14	5·0	10	With air damper.
12	Ewing-Gray type						
	(E.W.)	2	$3\frac{1}{2}$	5	1·5	600	Record-receiver starts automatically.
	(N.S.)	2	$3\frac{1}{2}$	5	1·5		
	(Vert.)	0·8					
13	Tanakadate						
	(E.W.)	1.5	1		1·5	150	Ditto.
	(N.S.)	1.5	1		1·5		
	(Vert.)	1.5	1		1·2		
14	(E.W.)	17	15	60	3·2	27	With magnetic damper.
15	(N.S.)	42	20	60	2·0	25	Ditto.
16	(E.W.)	10	5	210	1·5	50	
17	(N.S.)	15	$1\frac{1}{2}$	210	1·2	40	
18	(E.W.)	40	120	25	2·0	25	

(*to be continued.*)

(A) Tôkyô (Hongô). (*continued.*)

No.	Name or type component	Weight of the bob (kg.)	Magnification or minification	Natural period (sec.)	Damping ratio	Time scale mm./min.	Remarks
19	(N.S.)	60	120	20	2·5	25	
20	Wiechert (Vert.)	1300	120	6	5·0	15	With air damper.
21	(Vert.)	10	20	15	1·7	22·5	
22	(Vert.)	45	7½	20	3·0	4·0	With magnetic damper.
23	Galitzin. (E.W.)	13		Pendul. 24 Galva. 24	∞	27	With magnetic damper.
24	Galitzin. (N.S.)	13		Pendul. 24 Galva. 24	∞	27	Ditto.
25	Galtzin (vert.)			Pendul. 13 Galva. 13	∞		
26	Long Pendulum	300	50	6·7		60	
27	Ishimoto Acceleration seismograph (E.W. N.S.)	13		0·15	∞	57	1 mm. deviation of the index end =1 gal ca.
28	Clinograph (E.W.) (N.S.)	8 8	15 15	32 32		 0·12	

(B) Kamakura.

No.	Component	Weight of the bob (kg.)	Magnification	Natural period (sec.)	Damping ratio	Time scale mm./min.	Remarks
1	(E.W.) (N.S.) (Vert.)	2 2 0·45	2 2 2	10 10 5	2·0 2·0 2·0	40	With oil damper.
2	(E.W.)	15	10	30	1·2	15	
3	(Vert.)	4	10	10	2·0	25	
4	(E.W.) (N.S.)	7 7	50 50	10 10	1·5 1·5	50	

(C) Kiyosumi.

No.	Component	Weight of the bob (kg.)	Magnification	Natural period (sec.)	Damping ratio	Time scale mm./min.	Remarks
	(E.W.)	7	50	7	1·5	50	
	(N.S.)	7	50	7	1·5		

(D) Misaki.

No.	Component	Weight of the bob (kg.)	Magnification	Natural period (sec.)	Damping ratio	Time scale mm./min.	Remarks
	(E.W.)	12	120	4	1·5	50	
	(N.S.)	12	120	4	1·5		

(E) Titibu.

No.	Component	Weight of the bob (kg.)	Magnification	Natural period (sec.)	Damping ratio	Time scale mm./min.	Remarks
1	(E.W.)	7	50	7	1·3	60	
	(N.S.)	7	50	7	1·3		

(F) Tôgane.

No.	Component	Weight of the bob (kg.)	Magnification	Natural period (sec.)	Damping ratio	Time scale mm./min.	Remarks
1	(E.W.)	7	50	7	1·5	50	
	(N.S.)	7	50	7	1·5		

(G) Tukuba.

No.	Component	Weight of the bob (kg.)	Magnification	Natural period (sec.)	Damping ratio	Time scale mm./min.	Remarks
1	(N.S.)	35	120	21	2·0	25	
2	(E.W.)	35	120	21	2·0	25	

(H) Mitaka.

No.	Component	Weight of the bob (kg.)	Magnification	Natural period (sec.)	Damping ratio	Time scale mm./min.	Remarks
1	(E.W.)	7	50	7	1·3	60	
	(N.S.)	7	50	7	1·3		
	(Vert.)	7	28	7	1·3		
2	(E.W.)	40	80	18	2·0	25	
3	(N.S.)	40	80	18	1·9	25	

(3) *Sensible earthquakes in Tôkyô for the period January 1—March 31, 1931.*

List III.

Time=Central standard time of Japan (Civil mean time of the meridian 135° E).

Notation:

prel. tr.=Preliminary tremors.
N.S. =North-south component.
E.W. =East-west component.
2A =Range of motion.
T =Period of earthquake motion.
λ =Longitude.
φ =Latitude.
D =Depth.

Intensity: I (slight), II (rather weak), III (weak), IV (rather strong), V (strong), VI (violent).

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Epicentre		D	Intensity
				Prel. tr.	Total	N.S.		E.W.		λ (E)	φ (N)		
						2A	T	2A	T				
			h m s	s	m	μ	s	μ	s	°	°	km.	
1	Tôkyô	Jan. 5	17 14 59·3	15·0	2	32	(0·3)	34	(0·3)	139·6	35·00	90	I
	Kamakura			11·6	2·7	28	(0·3)	48	(0·3)				
	Misaki			12·0	3	21	(0·5)	22	(0·6)				
	Kiyosumi			13·2	2	4	(0·6)	13	(0·9)				
	Titibu			20·8	2			12	(0·8)				
	Tôgane			15·8	2	8	(0.4)	8	(0·4)				
	Tukuba		15 4·8	12·8	1·5								
	Mitaka		17 15 0·6	14.4	2	28	(0·2)	23	(0·2)				
2	Tôkyô	23	1 59 35·4	31·4	12	56	(0·6)	74	(0·6)	141·81	36·80		I
	Kamakura			37·0	14	30	(0·7)	34	(0·6)				
	Misaki			37·5	10	43	(0·7)	38	(0·6)				
	Kiyosumi			31·5	11	12	(0·9)	20	(0·9)				
	Titibu			35·0	6			68	(0·8)				
	Tôgane			24·8	10	26	(0·8)	16	(0·7)				
	Tukuba		1 59 22·1	21·5	5								II
	Mitaka		1 59 39·0	32·5	10	116	(2·4)	86	(2·1)				
3	Tôkyô	30	10 40 29·5	6·9	4	294	(0·4)	340	(0·4)	139·90	36·06	40	II
	Kamakura			13·2	3	10	(0·5)	8	(0·5)				
	Misaki			13·8	4	37	(0·5)	29	(0·7)				
	Kiyosumi			14·2	5	24	(0·5)	20	(0·6)				
	Titibu			8·4	5	44	(0·2)	22	(0·2)				
	Tôgane			9·1	3	44	(0·3)	46	(0·3)				I
	Tukuba		10 40 25·0	6·2	1·8								III
	Mitaka		10 40 32·2	8·7	3·5	86	(0·3)	128	(0·6)				II

List III. (*continued.*)

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Epicentre		(D)	Intensity
				Prel. Tr.	Total	N.S.		E.W.		λ (E)	φ (N)		
						2A	T	2A	T				
			h m s	s	m	μ	s	μ	s	o	o	km.	
4	Tôkyô	Feb. 4	8 33 55·8	12·7	3	36	(0·4)	28	(0·4)	140·00	35·00	50	I
	Kamakura												
	Misaki			8·1	3	20	(0·6)	28	(0·6)				I
	Kiyosumi												
	Titibu												
	Tôgane			11·6	3	22	(0·6)	10	(0·6)				
	Tukuba												
	Mitaka		8 33 56·8	11·7	2·5	15	(0·6)	27	(0·6)				
5	Tôkyô	4	13 37 32·3	12·2	2·5	44	(0·3)	36	(0·3)	139·91	35·29	90	I
	Kamakura												
	Misaki			9·9	3	17	(0·4)	15	(0·4)				
	Kiyosumi		13 37 21·0	11·8	2 5	8	(0·3)	6	(0·2)				
	Titibu			15·4	1	4	(0·3)	4	(0·3)				
	Tôgane			12·1	2	10	(0·3)	10	(0·3)				
	Tukuba												
	Mitaka		13 37 33·0	11·5	2	14	(0·3)	26	(0·3)				
6	Tôkyô	9	23 45 15·0	20·9	3	32	(0·3)	28	(0·3)	139·46	35·27	143	I
	Kamakura			19·3	3	20	(0·6)	30	(0·6)				
	Misaki			19·6	3	29	(1·7)	42	(0·6)				
	Kiyosumi			21·3	3	12	(1·2)	12	(1·2)				
	Titibu			22·3	3	16	(0·9)	12	(0·7)				
	Tôgane			22·5	3	22	(0·8)	20	(0·8)				
	Tukuba		23 45 16·6	25·4	1·6								
	Mitaka		23 45 14·9	20·2	3	32	(0·3)	38	(0·3)				
7	Tôkyô	20	6 42 33·4	5·0	1·5	66	(0·3)	90	(0·3)	139·73	35·79	40	
	Kamakura			8·0	1·5	11	(0·4)	8	(0·4)				
	Misaki			10·0	2	15	(0·8)						
	Kiyosumi			12·0	1·5	6	(0·8)	6	(0·8)				
	Titibu												
	Tôgane			9·6	2	30	(0·5)	25	(0·7)				
	Tukuba		6 42 35·9	8·6	1								
	Mitaka		6 42 33·7	4·8	1	50	(0·3)	62	(0·3)				
8	Tôkyô	20	14 35 34·0	99·7	90	3200	(5·8)	2500	(6·8)	137·60	43·40		I
	Kamakura			103·0	60	900	(4·8)	1100	(3·9)				
	Misaki			110·4	40	360	(1·4)	290	(1·4)				
	Kiyosumi		14 35 39·9	108·5	60	620	(5·0)						
	Titibu			97·5	30	1360	(7·4)	736	(4·8)				
	Tôgane			102·0									II
	Tukuba		14 35 28·0	93·5	29								I
	Mitaka		14 35 35·5	76·2	70								I
9	Tôkyô	23	20 08 07·3	15·3	7	61	(0·3)	40	(0·3)	140·61	36·30	50	
	Kamakura			20·7	7	32	(0·4)	48	(0·4)				
	Misaki			24·2	7	40	(0·6)	30	(0·6)				
	Kiyosumi			19·5	7	64	(3·3)	80	(2·6)				
	Titibu												
	Tôgane			14·9	6	40	(1·8)	46	(1·8)				
	Tukuba		20 07 55·5	9·6	3·5								
	Mitaka		20 08 09·0	17·5	6	48	(2·1)	28	(0·3)				

List III. (*continued.*)

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Epicentre		D	Intensity
				Prel. Tr.	Total	N.S.		E.W.		λ (E)	φ (N)		
						2A	T	2A	T				
			h m s	s	m	μ	s	μ	s	o	o	km.	
10	Tôkyô	Mar. 4	5 39 56·3	25·6	7	70	(0·6)	46	(0·6)				I
	Kamakura			29·0	9	70	(0·5)	62	(0·7)				
	Misaki			31·0	7	57	(0·6)	54	(0·6)				
	Kiyosumi		5 39 59·2	28·3	8	10	(1.2)	20	(1·2)				
	Titibu			27·3	7	24	(0·6)	46	(0·8)				
	Tôgane			24·0	5	100	(1·9)	120	(1·9)				
	Tukuba		5 39 30·2	20·4	6								II
	Mitaka		5 39 59·2	25·0	6	86	(1·0)	54	(0·5)				
11	Tôkyô	7	1 13 37·2	14·8	20	160	(0·5)	104	(0·5)	138·8	35·0		I
	Kamakura			11·7	20	370	(1·2)	140	(1·1)				
	Misaki			11·6	9	164	(0·5)	117	(0·5)				
	Kiyosumi			16·4	15	90	(3·5)	180	(3·5)				
	Titibu			12·2	5	86	(1·2)	11	(1·2)				
	Tôgane			22·3	15	44	(0·8)	26	(0·7)				
	Tukuba		1 13 44·5	20·2	7								
	Mitaka												
12	Tôkyô	7	1 53 49·7	15·4	15	620	(1·0)	310	(1·0)	138·9	35·0		II
	Kamakura			10·2	10	526	(1·1)	414	(1·5)				
	Misaki			10·1	10	455	(0·6)	262	(0·6)				
	Kiyosumi			16·2	10	170	(3·3)	192	(3·3)				
	Titibu			12·6	7	200	(1·0)	290	(1·1)				
	Tôgane			20·1	15	100	(1·0)	120	(1·1)				I
	Tukuba		1 53 54·5	20·0	9								II
	Mitaka		1 53 46·5	11·6	15	950	(1·7)	645	(1·6)				
13	Tôkyô	9	12 50 06·2	82·0	60	5600	(4·0)	8300	(4·7)	142·70	40·75		
	Kamakura			65·5	30	4250	(2·5)	3500	(2·6)				
	Misaki			75·5						(Off the coast of Hatinoye)			
	Kiyosumi		12 50 16·8	82·0									
	Titibu			72·0									
	Tôgane			86·6						(See Fig. 1)			I
	Tukuba		12 49 52·8	65·0	56								I
	Mitaka		12 50 05·8	77·5									I
14	Tôkyô	10	3 41 01·7	9·1	6	164	(0·3)	434	(0·3)	139·23	35·74	45	II
	Kamakura			9·4	6	65	(0·5)	62	(0·5)				
	Misaki			10·6	3	—	—	42	(0·6)				
	Kiyosumi			15·5	6	20	(0·8)	48	(0·9)				
	Titibu			7·4	4	100	(0·4)	108	(0·4)				
	Tôgane												
	Tukuba		3 41 04·8	10·8	2.3								
	Mitaka		3 41 01·3	8·8	4	248	(0·4)	326	(0·7)				II
15	Tôkyô	12	14 06 21·1	13·2	4	80	(0·7)	60	(0·7)	140·30	36·07	80	
	Kamakura												
	Misaki			17·6	3	58	(0·6)	46	(0·6)				
	Kiyosumi		14 06 21·8	16·9	2	4	(0·6)	10	(0·6)				
	Titibu			15·9	3	34	(0·4)	28	(0·5)				
	Tôgane			13·6	2			28	(0·9)				
	Tukuba		14 06 14·7	9·6	2								I
	Mitaka		14 06 22·2	14·1	2·5	62	(0·3)	50	(0·3)				

List III. (*concluded.*)

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Epicentre		D	Intensity
				Prel. Tr.	Total	N.S.		E.W.		λ (E)	φ (N)		
						2A	T	2A	T				
			h m s	s	m	μ	s	μ	s	°	°	km.	
16	Tôkyô	Mar. 23	17 28 41·8	7·5	4	52	(0·4)	61	(0·4)	140·2	36·0	30	
	Kamakura			13·4	3	20	(0·9)	20	(0·9)				
	Misaki			13·9	3	18	(0·7)	13	(0·6)				
	Kiyosumi			13·4	4	6	(0·6)	6	(0·6)				
	Titibu			10·4	3	24	(0·3)	20	(0·2)				
	Tôgane			9·0	3	15	(0·8)	26	(0·8)				
	Tukuba		17 28 39·1	5·7	1.7								
	Mitaka		17 28 43·1	9·3	3	15	(0·4)	46	(0·8)				
17	Tôkyô	23	20 24 43·7	6·9	3	24	(0·5)	30	(0·5)	139·83	36·05	20	I
	Kamakura			11·7	3	14	(0·6)	8	(0·6)				
	Misaki			15·3	3	5	(0·5)	3	(0·5)				
	Kiyosumi			14·1	1	4	(1·0)	3	(0·6)				
	Titibu			9·4	2	18	(0·2)	16	(0·2)				
	Tôgane			10·2	3	4	(0·4)	6	(0·5)				
	Tukuba		20 24 35·8	6·2	1.4								
	Mitaka		20 24 39·6	8·8	2·5	10	(0·4)	10	(0·7)				
18	Tôkyô	25	1 29 01·1	3·6	1	36	(0·4)	36	(0·4)				
	Kamakura			6·3	1.2	12	(0·3)	12	(0·3)				
	Misaki			8·1	1	10	(0·6)	10	(1·2)				
	Kiyosumi												
	Titibu												
	Tôgane												
	Tukuba												
	Mitaka		1 29 01·3	5·0	1	36	(0·2)	28	(0·2)				
19	Tôkyô	26	15 30 36·8	11·2	4	64	(0·3)	106	(0·3)	139·09	36.19	15	I
	Kamakura			14·4	3	32	(0·5)	48	(0·5)				
	Misaki			16·9	4	19	(0·9)	13	(0·9)				
	Kiyosumi			20·2	3	4	(0·6)	6	(0·5)				
	Titibu			3·8	3	112	(0·5)	140	(0·5)				
	Tôgane			18·1	2	20	(0·7)	25	(0·7)				
	Tukuba												
	Mitaka		15 30 33·1	11·1	3·5	40	(0·2)	32	(0·2)				
20	Tôkyô	27	5 25 35·9	9·3	4	81	(0·3)	96	(0·3)	140·36	35·34	30	II
	Kamakura			10·4	5	90	(0·6)	145	(0·6)				
	Misaki			9·7	5	57	(0·5)	71	(0·5)				
	Kiyosumi		5 25 31·1	4·9	4	420	(0·5)	448	(0·5)				II
	Titibu			18·0	4	30	(1·3)	20	(0·9)				
	Tôgane			5·0	3	650	(0·2)	550	(0·2)				III
	Tukuba		5 25 37·5	12·0	1.7								
	Mitaka		5 25 40·0	13·5	3·5	166	(0·5)	72	(0·5)				
21	Tôkyô	29	20 14 25·9	6·2	2.5	40	(0·5)	36	(0·5)	139·49	35·54	32	
	Kamakura			5·7	2	40	(0·4)	24	(0·4)				
	Misaki			7·3	2	22	(0·7)	19	(0·7)				
	Kiyosumi			11·4	3	4	(0·6)						
	Titibu			9·5	2,5	2	(0·5)	4	(0·7)				
	Tôgane			11·5	3	12	(0·5)	8	(0·9)				
	Tukuba		20 14 36·4	10·1	1								
	Mitaka		20 14 25·1	3·8	2	84	(0·5)	105	(0·3)				

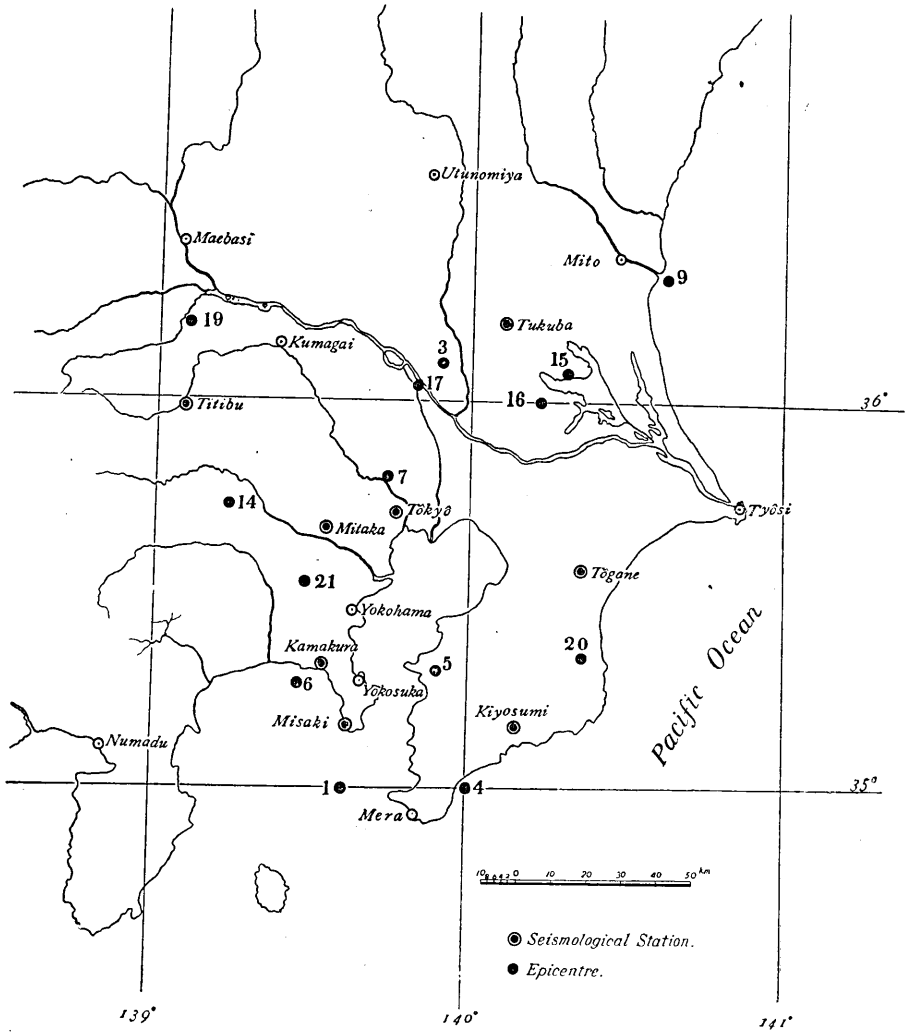


Fig. 2. Distribution of the epicentres of the sensible earthquakes that originated within 160 km. from Tôkyô for the period January 1-March 31, 1931. (Figures attached to each epicentre correspond to earthquake number in List III.)

(4) *Important distant earthquakes as observed in Tôkyô (Hongô).*

List IV.

Notation: EW = East-west component.
+ = towards east.
− = towards west.
NS = North-south component.
+ = towards north.
− = towards south.
G.M.T. = Greenwich mean time.

Date	Phase	Time of occurrence. (G. M. T.)	Amplitude (2A)	Period	Probable epicentre and remarks
		h m s	μ	sec.	
Jan. 15	P	2 05 22·2			Mexico.
	S	2 16 52·2			
	L	2 34 33·7			
	M(EW)	2 45 01·5	+ 400	25·2	
	M(NS)	2 35 22·2	− 550	23·3	
15	P	21 02 32·8			
	S	21 08 28·5			
	M(EW)	21 10 43·3	− 343	10·7	
	M(NS)	21 11 03·6	+ 363	10·6	
15	P	22 49 23·7			
	S	22 56 16·2			
	L	23 00 13·7			
	M(EW)	23 01 57·6	− 100	23·0	
	M(NS)	23 01 56·2	+ 225	25·0	
27	P	20 16 21·0			
	S	20 23 10·7			
	L	20 28 19·6			
	M(EW)	20 32 02·4	+1170	12·0	
	M(NS)	20 31 27·1	+1300	13·0	
28	P	21 29 21·9			
	S	21 33 57·1			
	L	21 35 21·4			
	M(EW)	21 35 36·2	−3000	25·0	
	M(NS)	21 36 46·2	+2167	27·0	
Feb. 2	P	22 59 09·6			New Zealand, Hawkes Bay.
	S	23 09 20·2			
	L	23 21 37·0			
	M(NS)	23 26 10·0	+1300	43·0	(See Fig. 3, 4)
	M(EW)	23 26 24·0	−1000	37·0	
	M(Vert.)	23 26 29·0	70	32·0	
	M(EW. max.)	23 32 0 (approx.)	2500	21·0	
	M(NS. max.)	23 28 30 (approx.)	1800	27·0	
	M(Vert. max.)	23 29 0 (approx.)	250	26·0	

(*to be continued.*)

List IV. (*concluded.*)

Date	Phase	Time of occurce (G. M. T.)	Amplitude (2A)	Period	Probable epicentre and remarks
10	P	6 44 23·0			
	S	6 51 56·0			
	L(?)	7 05 28·0			
	M(?)	7 08 38·0			
Mar. 19	P	6 30 19·8			
	S	6 35 08·8			
	L	6 37 00			
28	P	12 46 41·0			
	S	12 53 08·0			
	L(EW)	12 57 46·0	2100	58·0	
	L(NS)	12 57 46·0	300	59·0	
	M(EW)	13 00 00	600	63·0	
	M(NS)	13 00 00	1400	60·0	

(5) *Preliminary notes on the strong earthquake of June 17, 1931.*

After the previous report had already been written Tôkyô was strongly shaken by an earthquake in the evening of June 17. This earthquake caused no serious damage. In some parts of Tôkyô, however, electric lights went out owing to breakage of wires on account of shock. It is reported that in Itabasi, a suburb northwest of Tôkyô, a poultry-yard was burned down by fire through overturning of a petroleum lamp. It seemed that the shock was especially strong at the west or northwest suburb of Tokyo. In Yokohama the intensity was somewhat lighter than at Tôkyô, but all the electric lights and all street cars were put out of service for about ten minutes following the shock. Duration of the preliminary tremors at Hongô was 6,8 seconds, the beginning of which was felt strongly as an up-and-down motion. Duration of the sensible shocks at Tôkyô was about 40 seconds.

Times of occurrence of this earthquake at Hongô, Tukuba, Mitaka, Kamakura and Kiyosumi were as follows: These stations are supplied with wireless signals.

Station	Time of occurrence		
Tôkyô	21^h	09^m	$50{\cdot}3^s$
Mitaka	21	09	49.0
Tukuba	21	09	54·3
Kamakura	21	09	52·5
Kiyosumi	22	09	55·3

Durations of the preliminary tremors and directions of the initial motion.

Station	Duration of preliminary tremors	Direction of initial motion
Tôkyô	6·8 sec.	N 73° W down
Mitaka	6·7 ?	N 32° W down ?
Kamakura	10·3	N 21° W down
Titibu	8·1	N 56° W
Kiyosumi	13·5	N 35° W
Tôgane	12·1	N 66° W
Misaki	—	N 15° W
Tukuba	10·0	S 19° W
Koyama	9·6	E
Tanna	11·5	N 40° E down
Itô	11·6	N 32° E

(See Figs. 7—10.)

Maximum Range and period of the earthquake at Hongô.

All the seismographs having magnifications larger than ten-time were put out of order by the strong shock. The pointers of these seismographs were bent and gave only registers of the preliminary portion. The periods and the maximum ranges of component earthquake motions as registered by the strong motion seismograph (No. 3 in List II) were as follows:

Component	Range	(Period)
N. S.	42·1 mm.	(2·4 sec.)
E. W.	20·2 mm.	(2·4 sec.)
Vert.	8·3 mm.	(2.4 sec.)

(See Figs. 5 and 6)

Intensity (Acceleration) of the earthquake.

According to the Ishimoto acceleration seismograph diagram, (see Fig. 11), maximum accelerations of the horizontal component motions at Tôkyô (Hongô) were as follows:

Component	Max. Acceleration	Direction	Time from beginning of the earthquake.
E. W.	49·5 gal.	towards E.	10·4 sec.
N. S.	45·5 gal.	towards S.	9·5 sec.

Intensity of this earthquake was V (strong) in the intensity scale, or VII in the Rossi-Forel scale.

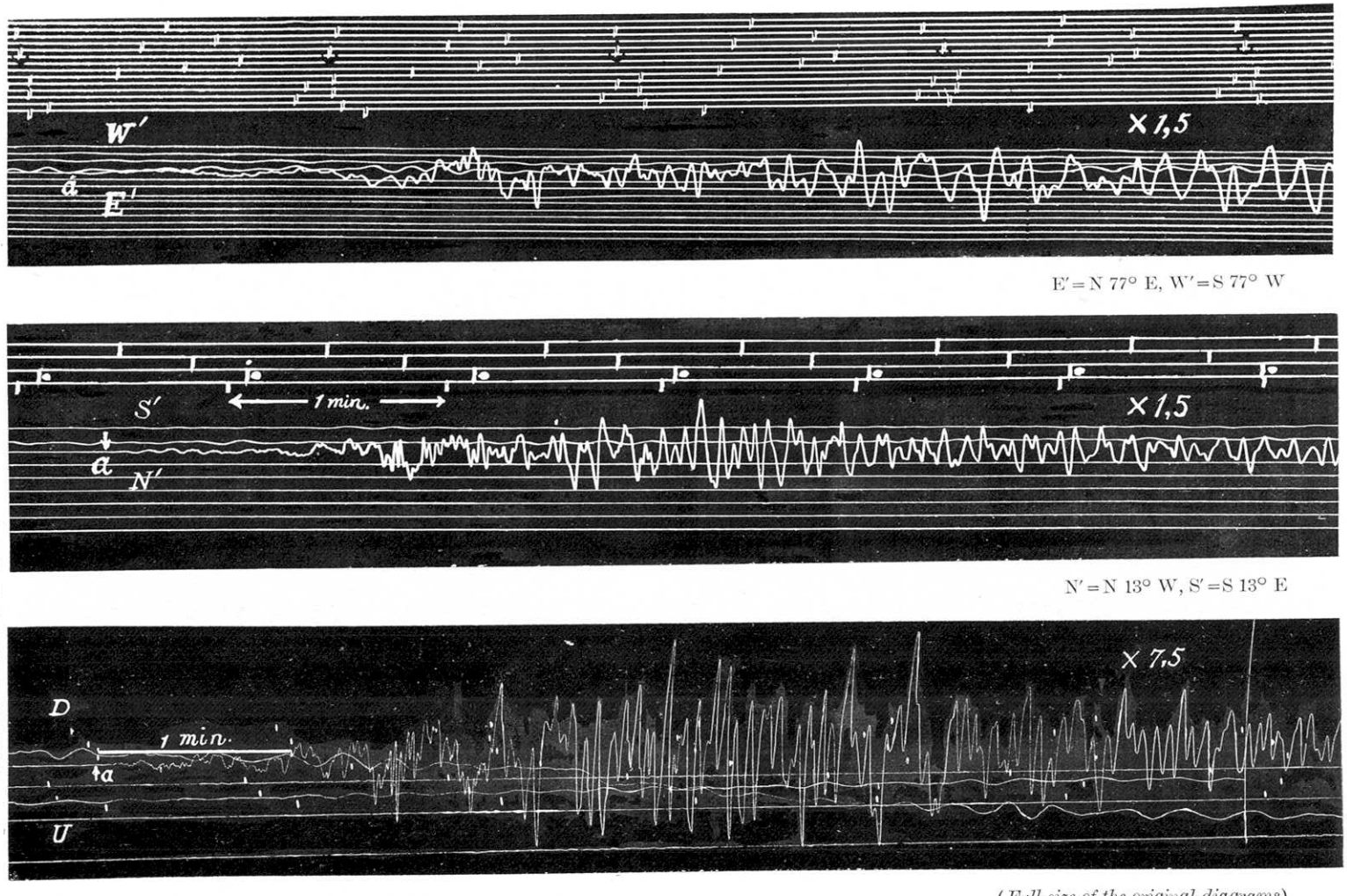
Probable origin of the earthquake. From the data above given the position of the epicentre and the approximate depth work out as follows:

Epicentre	Depth (approx.)
$\lambda = 139{\cdot}6°$ E $\varphi = 35{\cdot}7°$ N	45 km.

Epicentre is probably a point about 20 km. distant from Hongô in a westerly direction.

(N. Nasu and Ch. Yasuda are responsible for this report.)

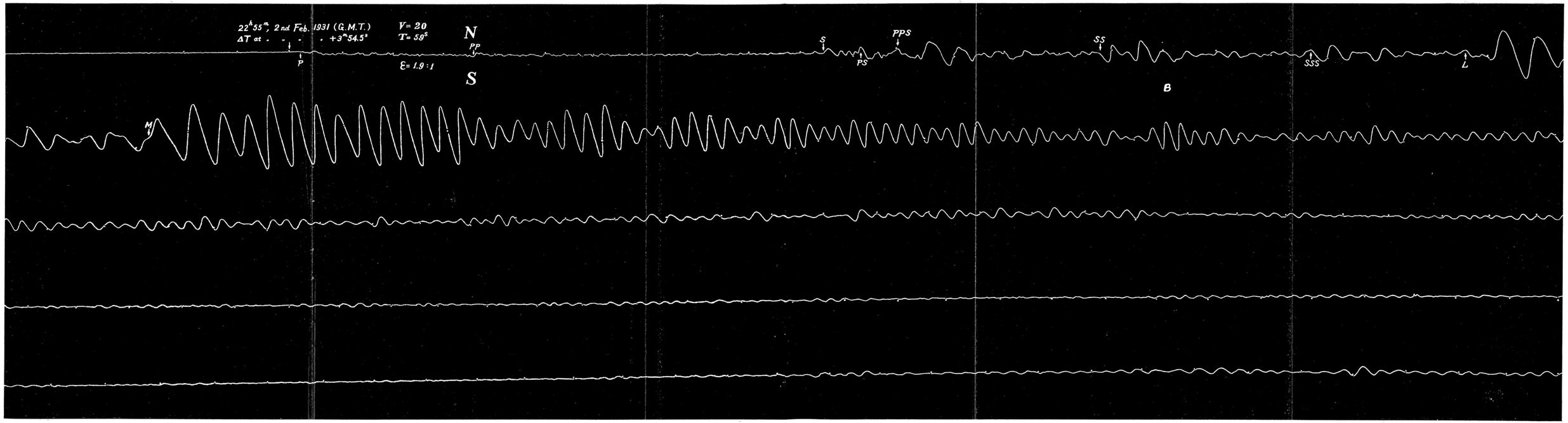
Fig. 1. Tôkyô Observation of the Northeast Japan earthquake of March 9, 1931.
a · · · · · · · · beginning.



(*Full size of the original diagrams*)

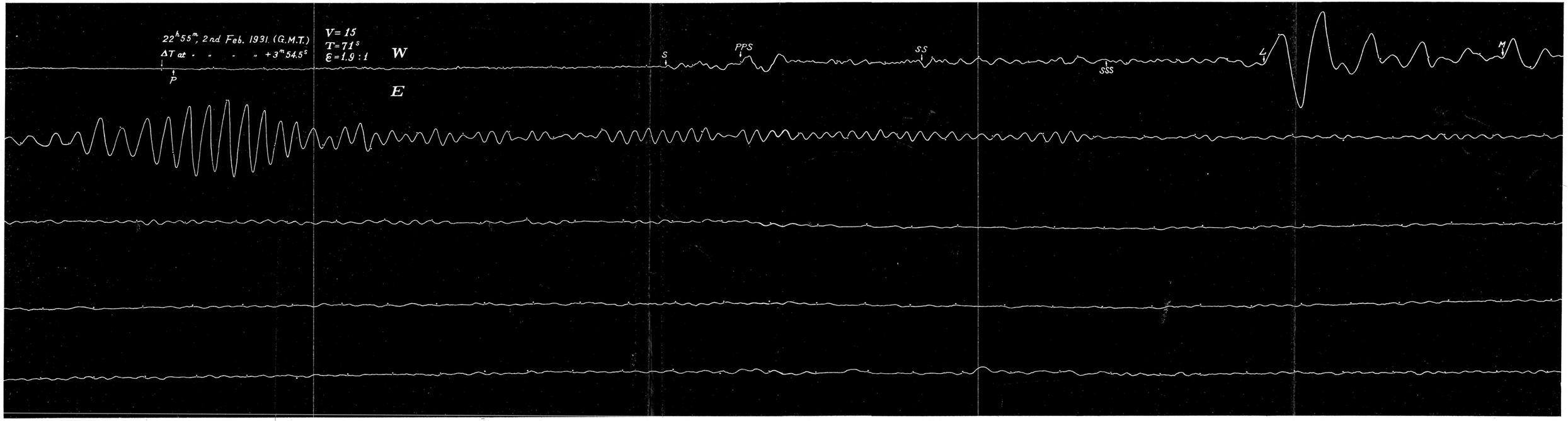
Instrumental constants: E. W. Compo ent [See No. 3 in List II (A)]. N. S. Component [See No. 3 in List II (A)].
Vertical Component [See No. 22 in List II (A)].

Fig. 3. Tôkyô Observation of the New Zealand Earthquake of Feb. 2, 1931.



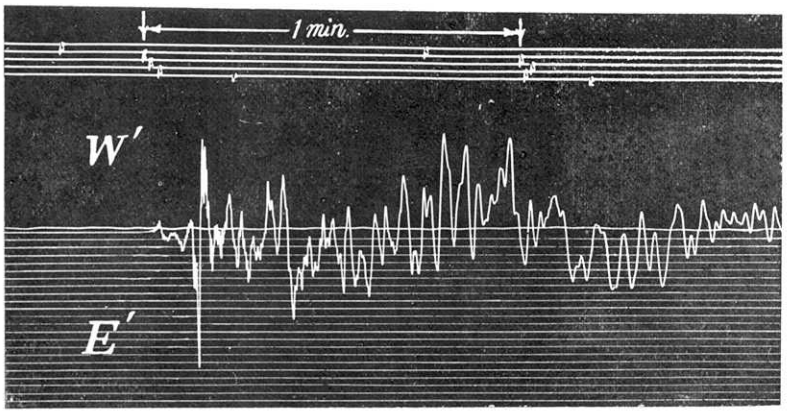
Instruments: [No. 15 in List II (A)]. Instrumental constants determined on Feb. 2 are shown on the upper left of this diagram.

Fig. 4. Tôkyô Observation of the New Zealand Earthquake of Feb. 2, 1931.

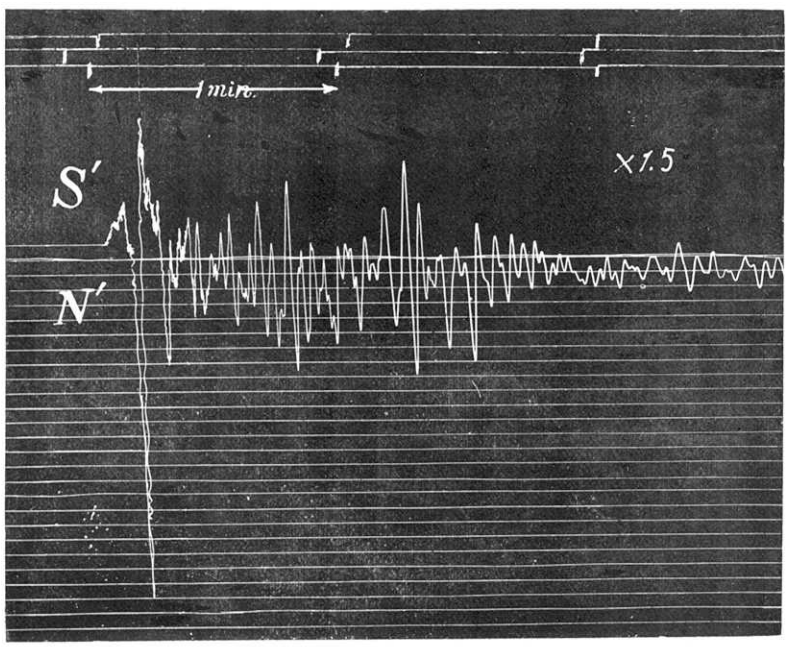


Instrument: [No. 14 in List II (A)]. Instrumental constants determined on Feb. 2 are shown on the upper left of this diagram. Interval between consecutive two breaks equals 1 minute.

Fig. 5. Tôkyô (Hongô) Observation of the Strong Earthquake of June 17, 1931.
Horizontal Pendulum Strong Motion Seismograph Diagrams.



E′ = N 77° E, W′ = S 77° W (*Full size of the original diagram*)

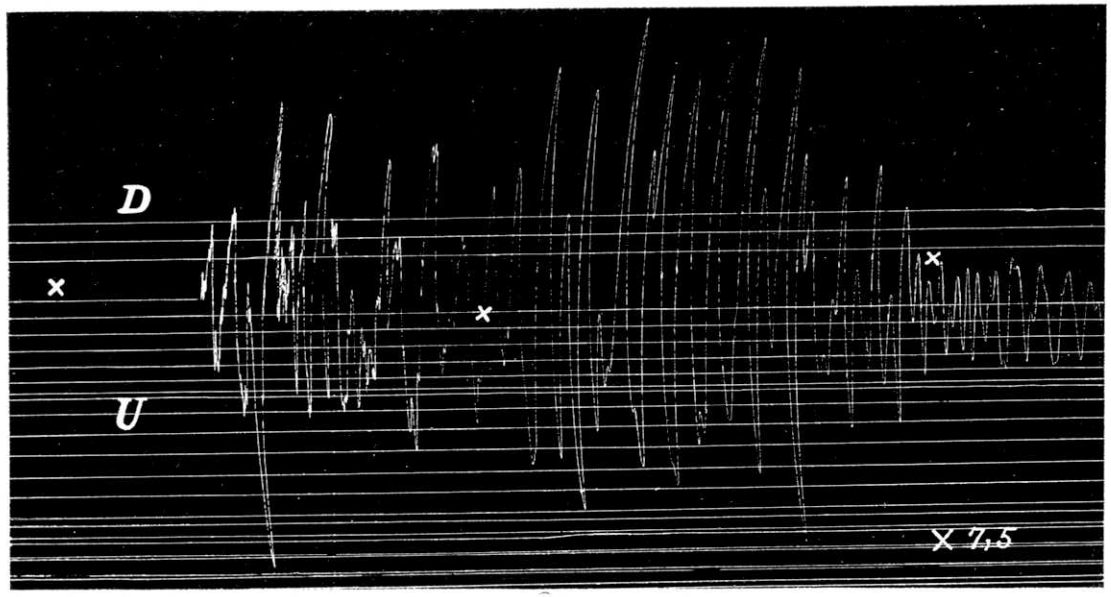


N′ = 13° W, S′ = S 13° E (*Full size of the original diagram*)

Instrumental constants: E. W. Component [See No. 3 in List II (A)].
N. S. Component [See No. 3 in List II (A)].

（震研彙報、第九號、圖版、那須）

Fig. 6. Tôkyô Observation of the Strong Earthquake of June 17, 1931.
Vertical Seismograph Diagram.

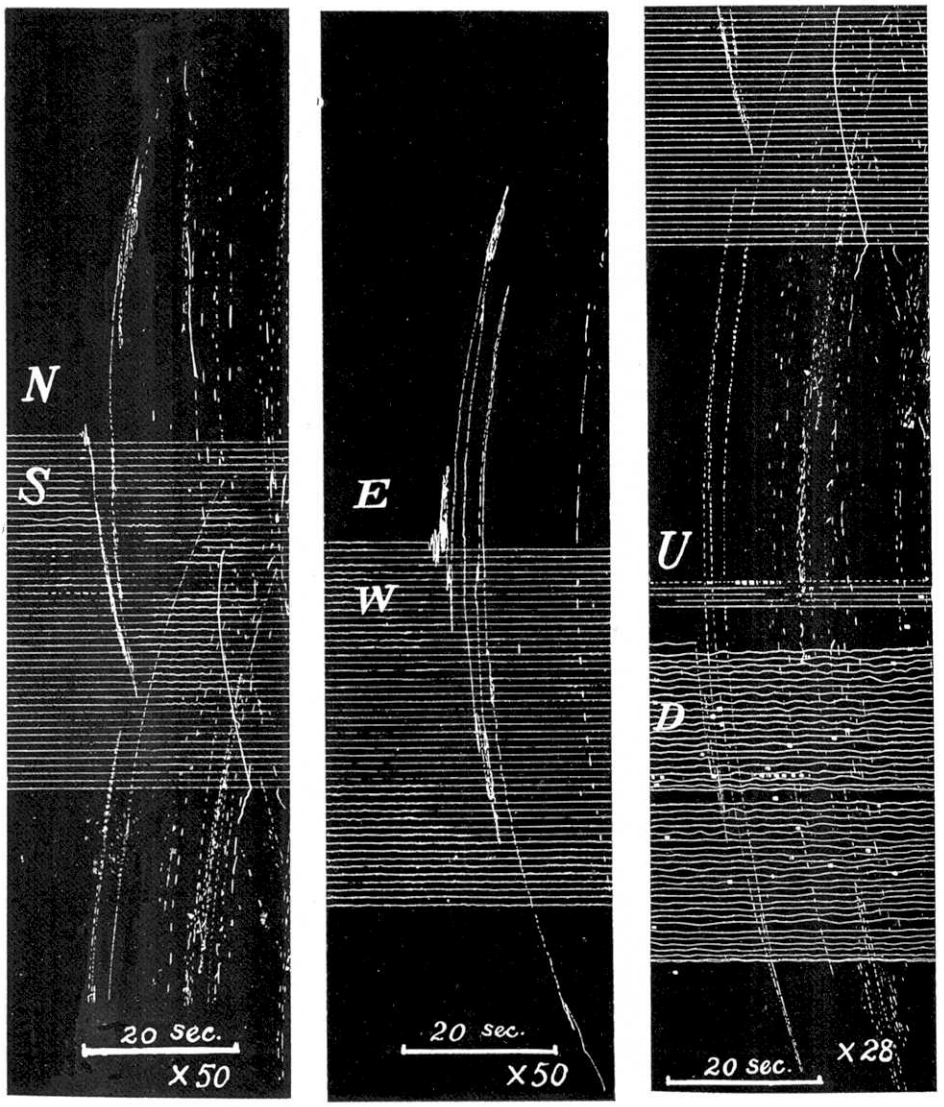


(震研彙報、第九號、圖版、那須)

(Full size of the original diagram)

Instrumental constants: [See No. 22 in List II (A)]. In erinal between consecutive two breaks indicated by × equals to 1 minute.

Fig. 7. Tôkyô Observation of the Strong Earthquake of June 17, 1931.
Three Component Motions Seismograph Diagram.

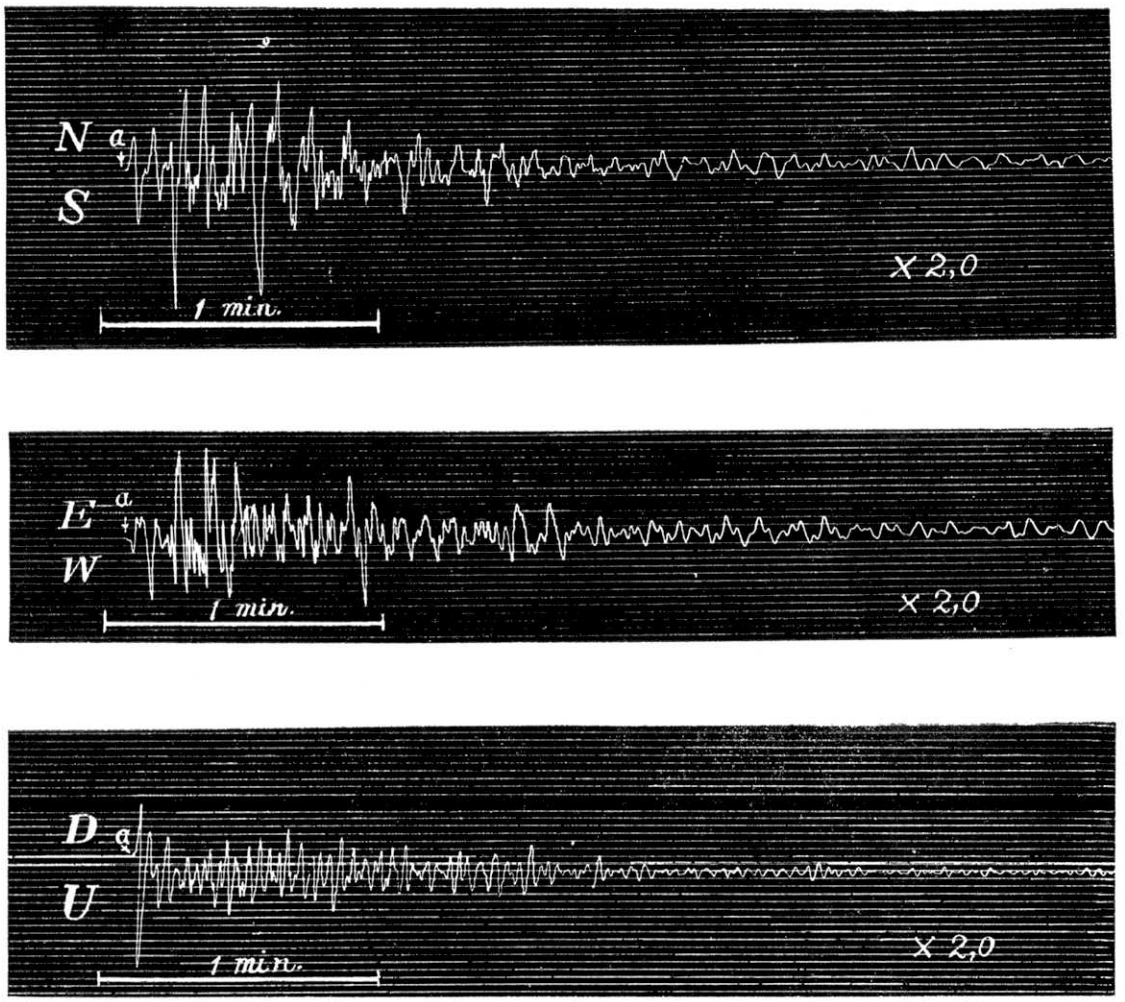


（震研彙報、第九號、圖版、那須）

(*Full size of the original diagram*)

Instrumental constants: [See No. 5 in List II (A)].

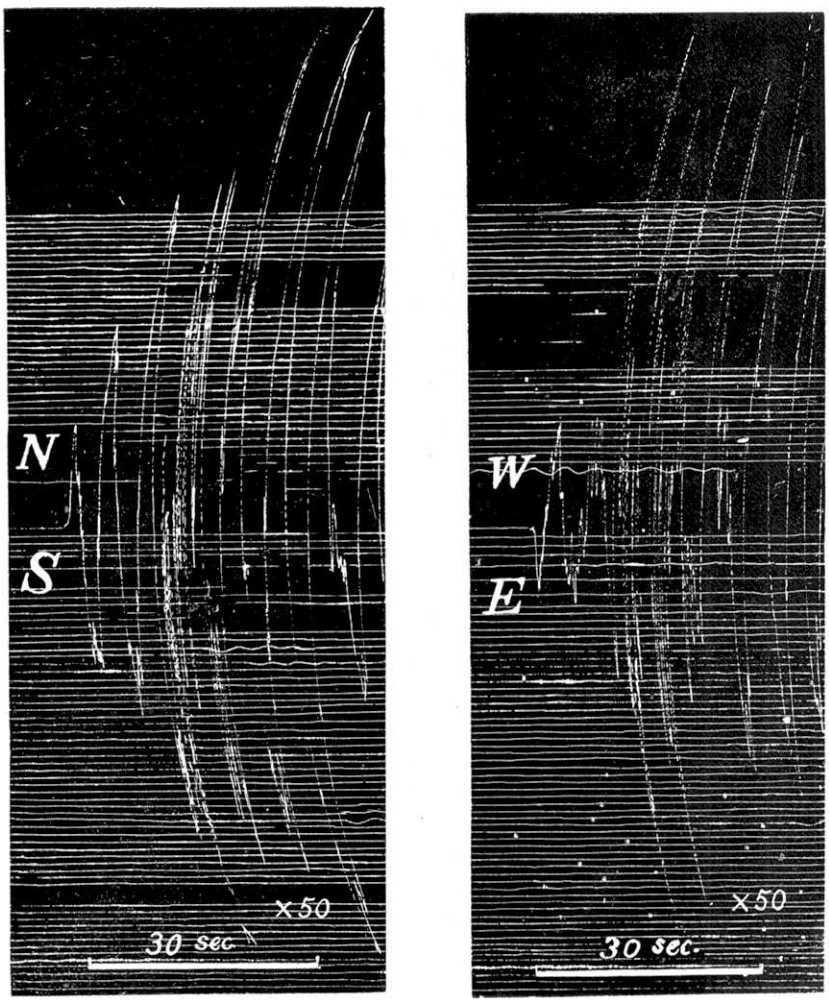
Fig. 8. Kamakura Observation of the Strong Earthquake of June 17, 1931
Strong Motion Seismograph Diagram.



(*Full size of the original diagram*)

Instrumental constants: [See No. 1 in List II (B)].

Fig. 9. Itô Observation of the Strong Earthquake of June 17, 1931.
Horizontal Motion Seismograph Diagram.



(震研彙報、第九號、圖版、那須)

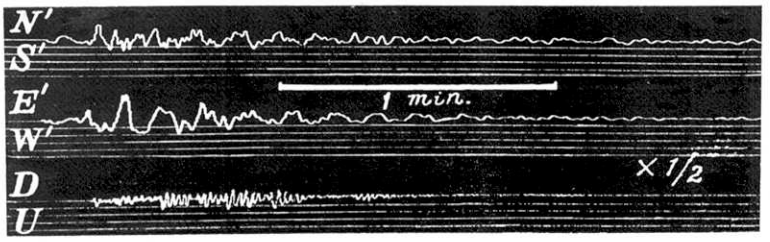
(Full size of the original diagram)

Instrumental constants:

Component	Natural Period	Magnification	Damping Ratio
E.W.	6·5 sec.	50	1·30
N.S.	6·5 sec.	50	1·20

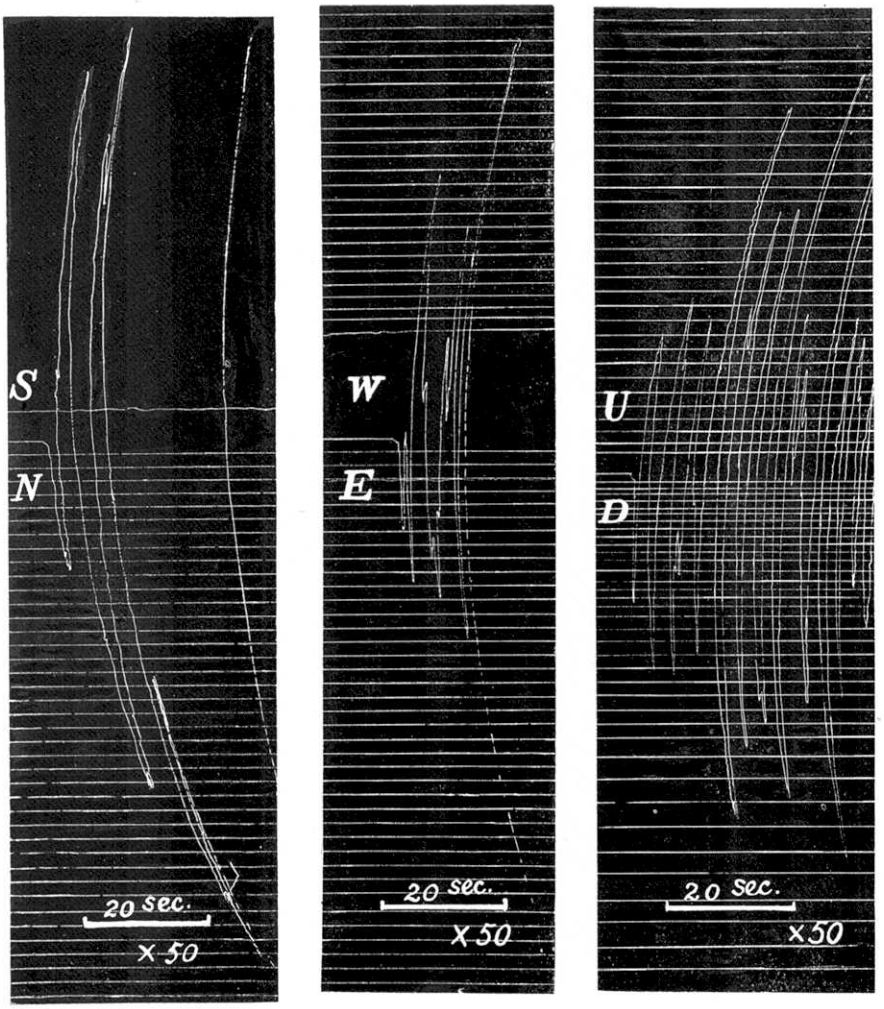
Fig. 10. Tanna Observation of the Strong Earthquake of June 17, 1931.
(A) Strong Motion Seismograph Diagram.
(B) Three Component Motions Tromometer Diagram.

(A)



(*Full size of the original diagram*)

(B)



(震研彙報、第九號、圖版、那須)

Instrumental constants: (*Full size of the original diagram*)

	Natural Period	Minification or Magnification	Damping Ratio
Strong motion seismograph E.W.	10 sec.	1/2	1·30
N.S.	10	1/2	1·30
Vert.	4	1/2	1·20
Tromometer E.W.	5·8	50	1·40
E.S.	5·4	50	1·58
Vert.	3·5	50	1·20