

### 34. Seismometrical Report.

#### 地震観測報告

(Earthquake Research Institute, Tôkyô, Japan.)

(October 1—December 31, 1931.)

#### (1) Sensible earthquakes in Tôkyô for the period October 1—December 31, 1931.

##### List I.

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. =West-East component.  
2A =Range of motion.  
T =Period of earthquake motion.  
 $\lambda$  =Longitude.  
 $\varphi$  =Latitude.  
D =Depth of focus.

Intensity: 0 (no feeling), I (slight), II (rather weak), III (weak),  
IV (rather strong), V (strong), VI (violent).

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direc- tion of initial motion	Epicentre		D	Intensity
				Prel. tr.	Total	N. S.		E. W.			$\lambda$ (E)	$\varphi$ (N)		
						2A	T	2A	T					
71	Tôkyô Kamakura Misaki Kiyosumi Titibu Tôgane Tukuba Mitaka	Oct. 3	<sup>h</sup> <sup>m</sup> <sup>s</sup> 2 36 55.2	<sup>s</sup> <sup>m</sup> 8 6 15 11 0 8 13 8 8 16 2 13 4 6 8 15 0 14 8 6 11 7 5 6	<sup>μ</sup> <sup>s</sup> 300 1.3 680 0.8 467 3.0 260 4.2 1400 1.2 860 1.0 600 0.59	<sup>μ</sup> <sup>s</sup> 550 1.4 340 0.8 400 2.0 180 2.4 1200 1.2 950 1.0 590 0.59	S34°E, u. S6°E S27°E  S80°W S35°E	139°20'	35°91'	24 km	II II II II III II II II			

(to be continued.)

## List I. (continued.)

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direction of initial motion	Epicentre		D	Intensity
				Prel. tr.	Total	N. S.		E. W.			$\lambda$ (E)	$\phi$ (N)		
						2A	T	2A	T					
72	Tôkyô Kamakura Misaki Kiyosumi Titibu Tôgane Tukuba Mitaka	Oct. 13	<sup>h</sup> <sup>m</sup> <sup>s</sup> 21 14 06.0 21 13 55.6	<sup>s</sup> 5.2 4.3 5.1 7.0 10.6 9.8	<sup>m</sup> 3 2 3 1 2 2	<sup><math>\mu</math></sup> <sup>s</sup> 400 0.39 190 0.65 131 1.00 20 0.3 20 0.5	<sup><math>\mu</math></sup> <sup>s</sup> 250 0.39 130 0.65 67 1.1 16 0.3 22 0.4			139° 78'	35° 44'	<sup>km</sup> 24	II I	
73	Tôkyô Kamakura Misaki Kiyosumi Titibu Tôgane Tukuba Mitaka	18	4 42 42.0	5.3 10.0 6.5 8.8	2 1 1 1.3	67 0.48 6 0.25 8 0.3	53 0.48 5 0.50 4 0.35			140° 00'	35° 65'	35	I	
74	Tôkyô Kamakura Misaki Kiyosumi Titibu Tôgane Tukuba Mitaka	23	12 16 27.7 12 16 33.5	8.5 11.6 14.0 18.6 3.4 14.5	6 3 2 3 2 4	76 0.28 40 0.67 18 1.1 8 100 0.4 58 0.53	64 0.28 44 0.67 9 0.6 6 0.4 112 0.6 56 0.9	S58°E		139° 23'	36° 00'	24	I     I	
75	Tôkyô Kamakura Misaki Kiyosumi Titibu Tôgane Tukuba Mitaka	30	3 53 34.7	1.67 26.0 20.0 16.0 10.0	12 9 6 15 12	320 1.00 90 2.2 36 0.80 180 0.85	166 1.00 78 1.00 42 0.80 250	N41°E, d		141° 20'	36° 10'		I     II II	
76	Tôkyô Kamakura Misaki Kiyosumi Titibu Tôgane Tukuba Mitaka	31	23 17 01.5 23 16 58.2	17.3 10.4 10.8 10.4 16.3 15.2	7 4 5 8 3 10	63 1.00 16 0.26 79 1.6 44 1.3 8 0.8 30 0.5	91 0.47 64 0.52 29 36 0.95 8 0.75 30 0.8			140° 00'	34° 30'	20	I	
77	Tôkyô Misaki Kamakura Kiyosumi Titibu Tôgane Tukuba Mitaka	Nov. 3	4 56 01.5 4 55 58.3	24.4 19.0 16.1 16.2 28.8 21.4 25.7	10 6 10 7 6 7 9	98 0.77 124 0.43 345 1.90 70 1.50 40 1.13 60 1.04	104 0.78 96 0.43 517 1.42 50 1.50 40 1.13 66 1.04			140° 36'	34° 21'	50	I      II	

(to be continued.)

## List I. (continued.)

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direc- tion of initial motion	Epicentre		D	Intensity
				Prel. tr.	Total	N. S.		E. W.			$\lambda$ (E)	$\varphi$ (N)		
						2A	T	2A	T					
78	Tôkyô Kamakura Misaki Kiyosumi Titibu Tôgane Tukuba Mitaka	Nov. 9	<sup>h</sup> 21 <sup>m</sup> 33 <sup>s</sup> 37·1	<sup>s</sup> 9·4 7·8	<sup>m</sup> 2 1·3	<sup>μ</sup> 76 16	<sup>s</sup> 0·32	<sup>μ</sup> 56 20	<sup>s</sup> 0·32	S78°E	139°97	35°23	45	I
			21 33 37·2	7·1 13·4	2 1·5	16	0·21	12	0·21 0·68					II
			21 33 42·3	9·3 11·6	2 1·4	16	0·29	8	0·34					
79	Tôkyô Kamakura Misaki Kiyosumi Titibu Tôgane Tukuba Mitaka	12	15 9 01·5 15 9 00·7 15 8 53·6 15 9 02·1	13·7 13·0 8·4 13·0	16 8 14 12	266 1700 800 1460	2·36 0·60 0·58 0·79	350 1440 700 710	1·65 0·60 0·58 0·79	S58°E N75°E	140·57	35·22	50	I II III III II I
80	Tôkyô Kamakura Misaki Kiyosumi Titibu Tôgane Tukuba Mitaka	12	22 11 22·8 22 11 16·0 22 11 25·5	18·0 14·6 21·3	9 4 6	140 120 60	0·47 0·68 0·52	95 64 24	0·60 0·68 0·52		139·59	34·77	50	I I
81	Tôkyô Kamakura Misaki Kiyosumi Titibu Tôgane Tukuba Mitaka	29	3 36 30·4	8·6 10·3 9·7 15·0 9·1	2 3 1·5 2 2	52 42 70 8 12	0·45 0·50 0·37 0·83 0·39	40 29 16 6 16	0·45 0·50 0·43 0·83 0·39		140·00	35·51	60	I
82	Tôkyô Kamakura Misaki Kiyosumi Titibu Tôgane Tukuba Mitaka	Dec. 2	2 15 43·0	14·1 18·1 14·8 18·1 11·3	3 3 2 1·5 2	50 8 4 8	0·47 0·62 0·55 0·2	32 8 4 10 10	0·57 0·62 0·55 0·40 0·20		140·58	35·79	80	I
83	Tôkyô Kamakura Misaki Kiyosumi Titibu Tôgane Tukuba Mitaka	2	13 00 25·1 13 00 23·6	9·4 7·0 9·8 9·4 9·8 18·4	3 3 3 3 1·5 3	56 24 29 2 20 6	0·28 0·47 0·46 0·50 0·31 0·90	34 74 65 4 25 6	0·28 0·47 0·62 0·50 0·31 0·90		138·79	35·38	10	I

(to be continued.)

## List I. (continued.)

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direction of initial motion	Epicentre		D	Intensity
				Prel. tr.	Total	N. S.		E. W.			$\lambda$ (E)	$\varphi$ (N)		
						2A	T	2A	T					
84	Tôkyô Kamakura Misaki Kiyosumi Titibu Tôgane Tukuba Mitaka	Dec. 11	<sup>h</sup> <sup>m</sup> <sup>s</sup> 0 57 18.2 0 57 19.4 0 57 14.3	<sup>s</sup> 10.3 9.6 6.1	<sup>m</sup> 4 2.5 3	<sup>μ</sup> <sup>s</sup> 44 0.29 90 0.56 80 0.24	<sup>μ</sup> <sup>s</sup> 46 0.29 180 0.56 54 0.24	<sup>μ</sup> <sup>s</sup> 10 0.33 10 0.19 340 0.19	S slight w	140°25	35°22	30	I II  II II	
85	Tôkyô Kamakura Misaki Kiyosumi Titibu Tôgane Tukuba Mitaka	15	21 55 16.9	7.4	3	16 0.51	16 0.51			140.05	35.72	50	I	
				10.5	3	10 0.66	19 0.66							
				12.2	2	10 0.73	10 0.73							
				15.5	2		6 1.1							
				8.3	3	16 0.54	9 0.54							
86	Tôkyô Kamakura Misaki Kiyosumi Titibu Tôgane Tukuba Mitaka	16	2 14 57.0 2 15 01.2	10.8 16.1	6 3	86 0.20 352 0.65	98 0.30 246 0.65			139.95	36.30	55	I	
				16.5	4	54 0.74	54 0.92							
				16.5	5	20 0.72	20 0.72							
				10.8	2.5		104 0.21							
				12.5										
87	Tôkyô Kamakura Misaki Kiyosumi Titibu Tôgane Tukuba Mitaka	19	2 14 02.5 2 14 04.7	8.5 12.8	8 5	200 0.54 130 0.53	194 0.54 84 0.53	N77°E, d	140.26	35.77	45	I II I		
				12.9	6	186 0.52	111 0.52							
				10.4	6	60 0.78	30 0.78							
				15.7	6	82 1.80	30 1.80							
				6.6	5	410 1.16	580 0.98							
88	Tôkyô Kamakura Misaki Kiyosumi Titibu Tôgane Tukuba Mitaka	24	23 18 03.5 23 17 58.3	10.1 7.3	2 1.5	27 0.51 14 0.31	35 0.54 30 0.42		139.99	35.50	18	I I		
				7.3	1.5	8 0.19	8 0.19							
89	Tôkyô Kamakura Misaki Kiyosumi Titibu Tôgane Tukuba Mitaka	26	14 15 54.9	8.2	4	72 0.23	50 0.23	S23°W	139.92	36.26	30	I		
				15.7	4	11 0.48	14 0.48							
				9.9	2	54 0.17	46 0.17							
				11.5	3	20 0.56	12 0.56							

(2) *Important distant earthquake as observed in Tôkyô (Hongô).*

List II.

Date	Phase	Time of Occurrence (G. M. T.)	Amplitude 2A	Period	Probable Epicentre
1931 Oct. 3	P	19 <sup>h</sup> 22 <sup>m</sup> 16 <sup>s</sup> ·2			15°E, 16°S
	S	19 29 25·2			
	L	19 34 37·0	(EW) 4·6 <sup>mm</sup> (NS) 3·3	52 <sup>sec</sup> 63	
	M	19 38 27·0	(EW) 4·4 (NS) 4·6	19 21	
Oct. 10	F	22			160°E, 16°S
	P	0 28 44·0			
	S	0 35 56·9			
	L	0 40 54·1	(EW) 4 (NS) 2·8	60 50	
	M	0 48 41·2	(EW) 3·2 (NS) 3·7 (V) 1·5	20 15 18	
	F	2			

*Daily frequency of the earthquake felt in Tôkyô during 1931.*

List III.

Date	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1							1					
2						1	1					2
3										1	1	
4		2	1	1	1							
5	1											
6												
7			2						1			
8							1					
9		1	1			1			1		1	
10			1				2	1				
11						1						1
12			1		1						2	

(to be continued.)

List III. (*continued.*)

Date	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
13										1		
14						1						
15				1								1
16									1			1
17						3						
18								1	1	1		
19							1	1				1
20		2					1					
21									3			
22												
23	1	1	2			1			1	1		
24				1					3			1
25			1		2	1						
26			1		1		1		1			1
27			1					1				
28							2		2			
29			1								1	
30	1					2	1			1		
31							1			1		
Sum	3	6	12	3	5	11	12	4	14	6	5	8

Total sum=89.

(N. Nasu and Ch. Yasuda.)

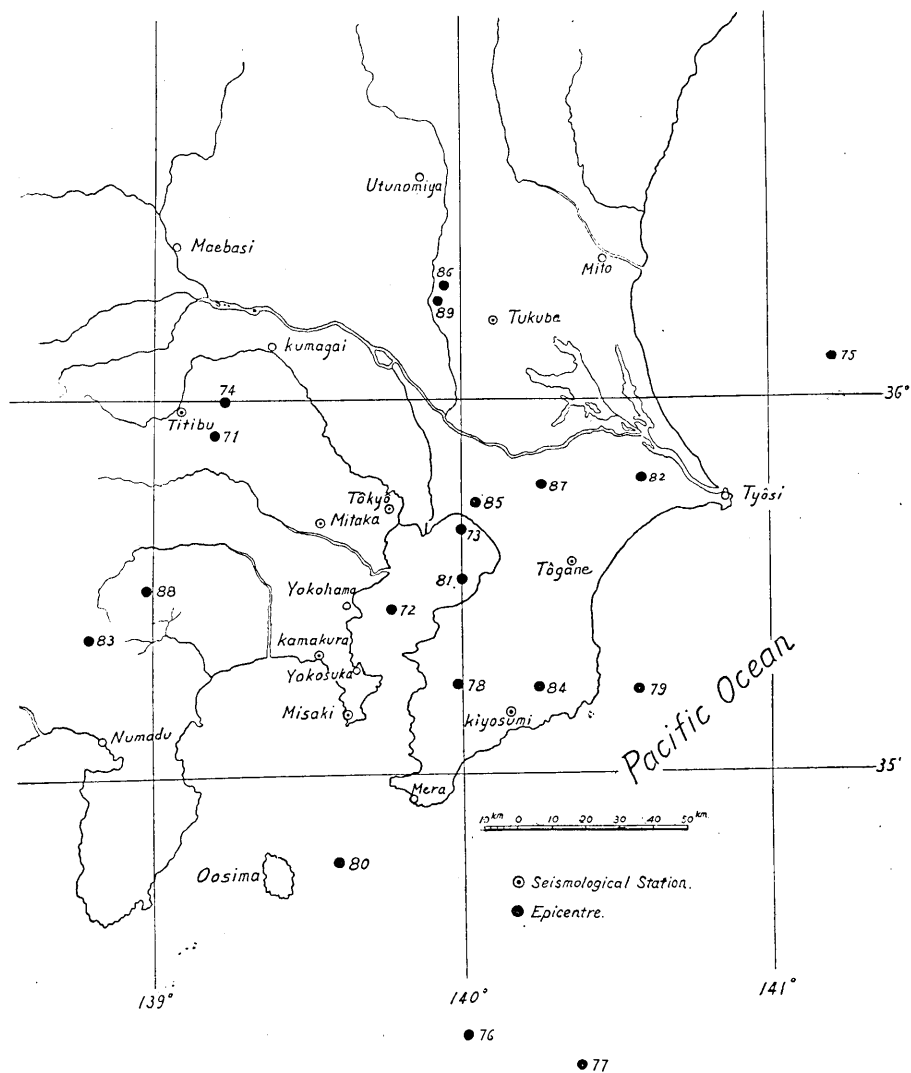
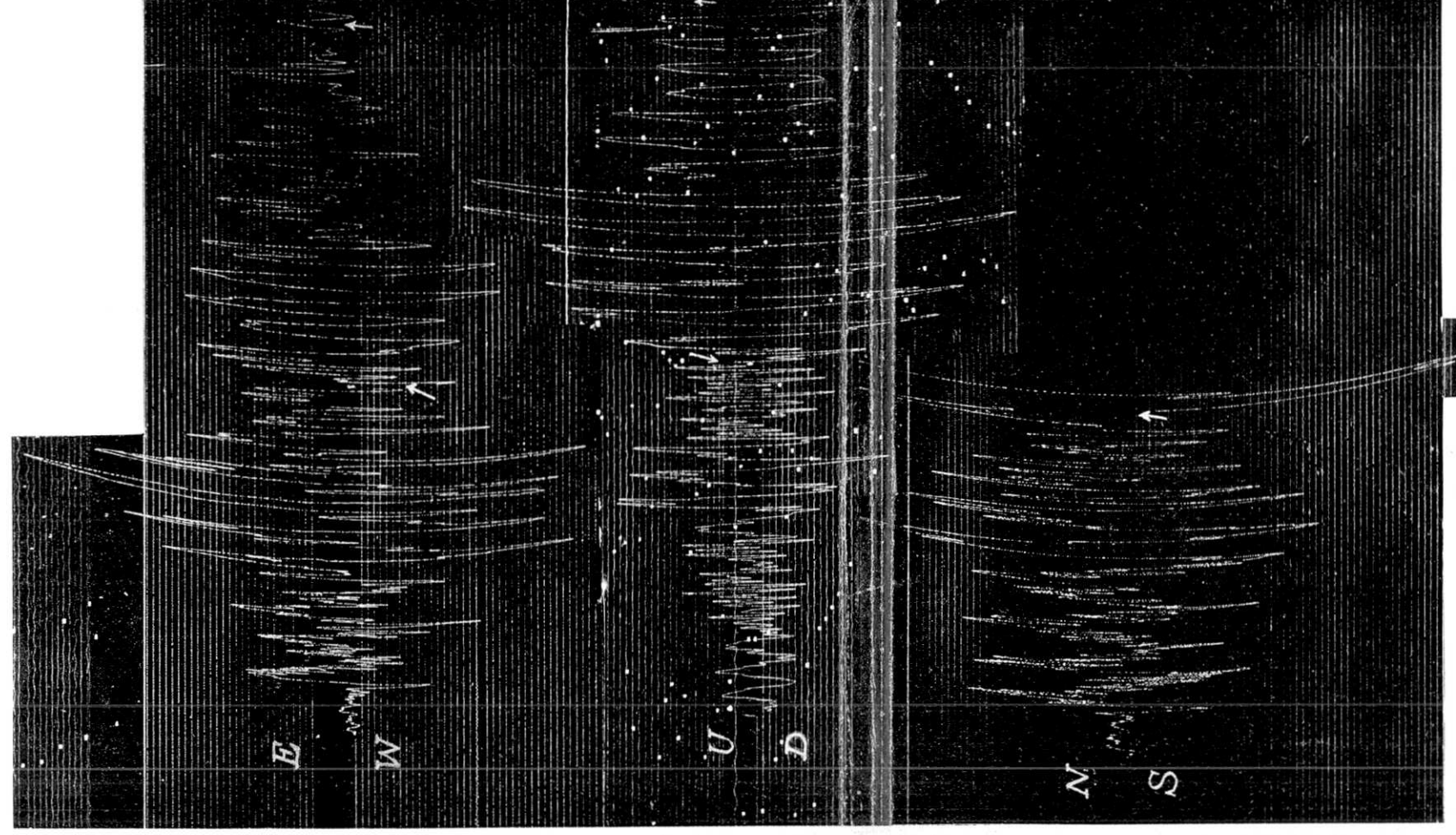


Fig. 1. Distribution of the earthquakes that originated within a distance of 160 kms. from Tōkyō and felt there, for the period October 1-December 31, 1931.

(Figures attached to each epicentre indicate the earthquake number in List I.)



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Fig. 2. Tōkyō observation of the earthquake of Oct. 3, 1931.

Instrument = No. 5.

Comp.	Period	Magnification	Damping ratio
N. S.	7 s	50	1.5
E. W.	7	50	1.5
Vert.	7	28	1.5



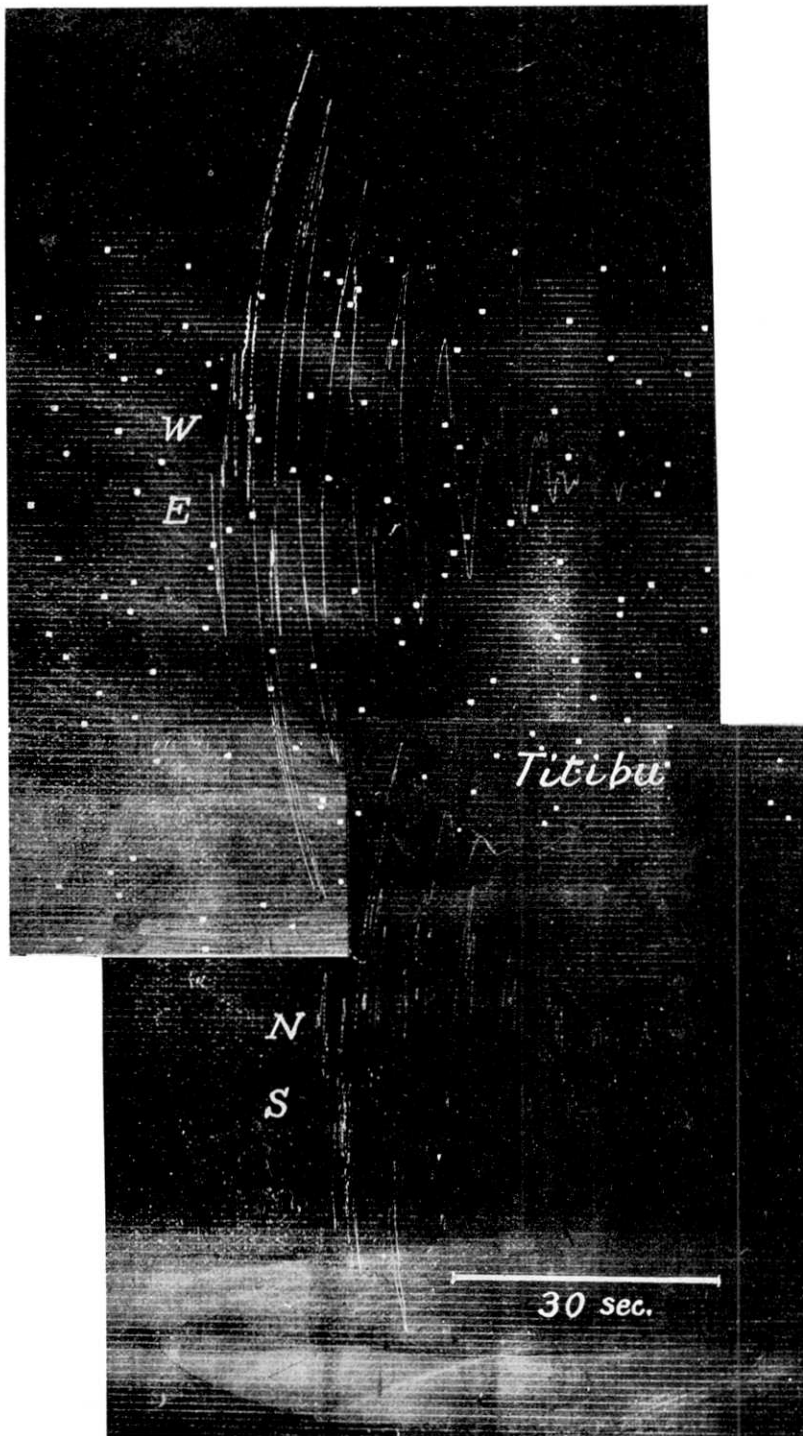


Fig. 3. Titibu observation of the earthquake of Oct. 3, 1931.

*Instrumental constants:* Natural period=7 s.

Magnification=50.

Damping ratio=1.

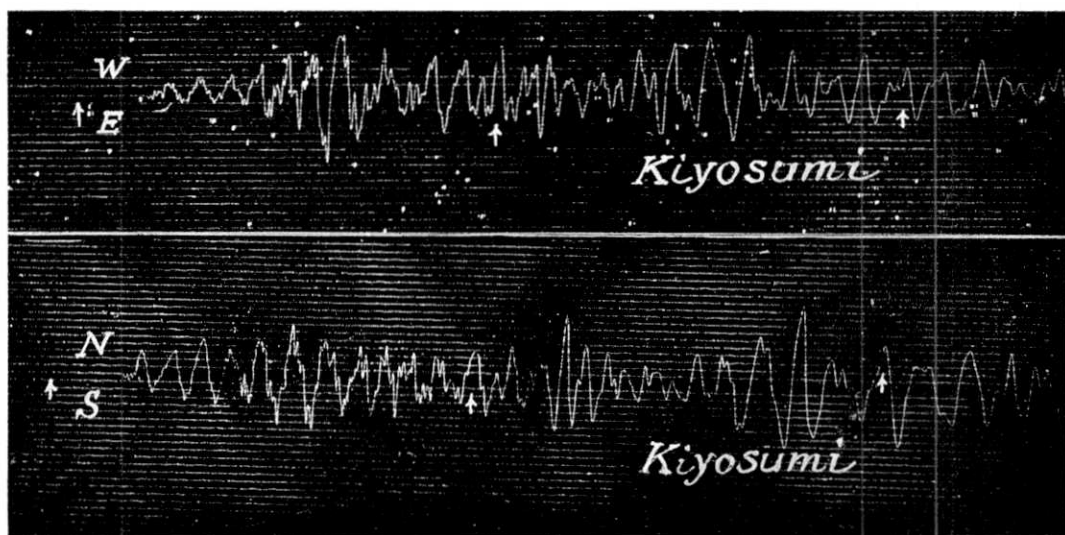
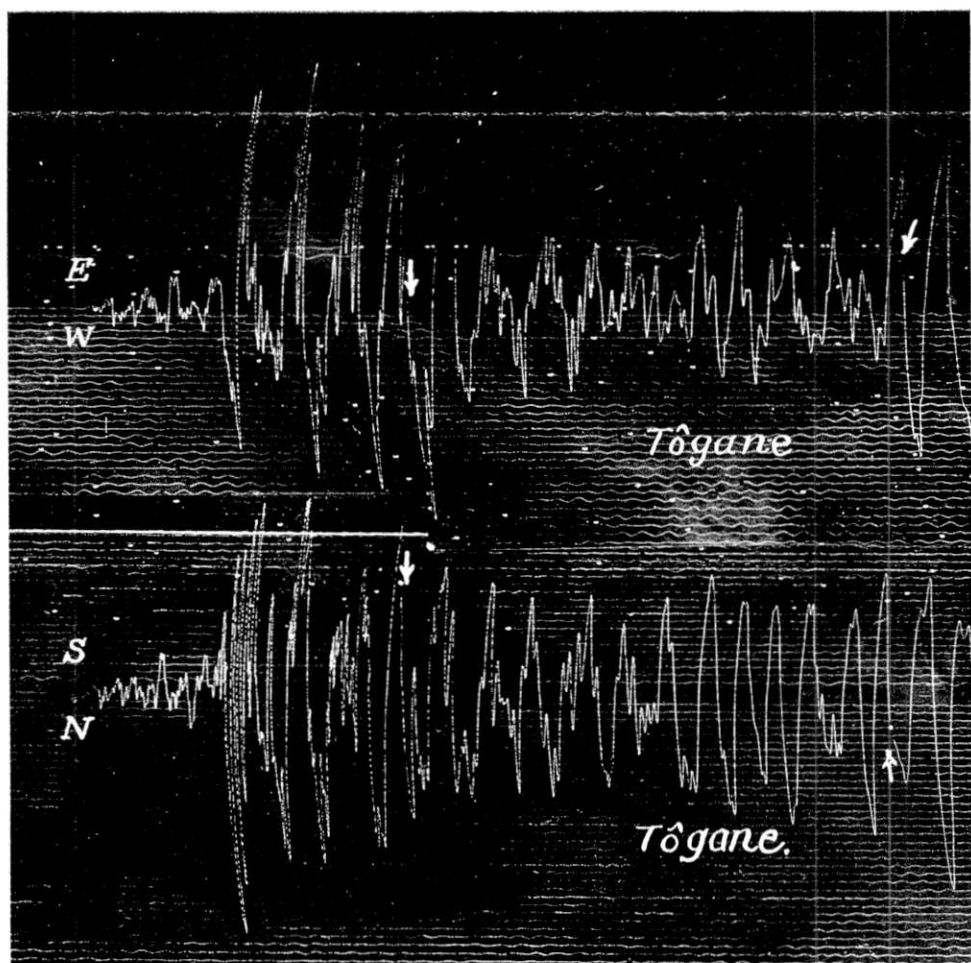
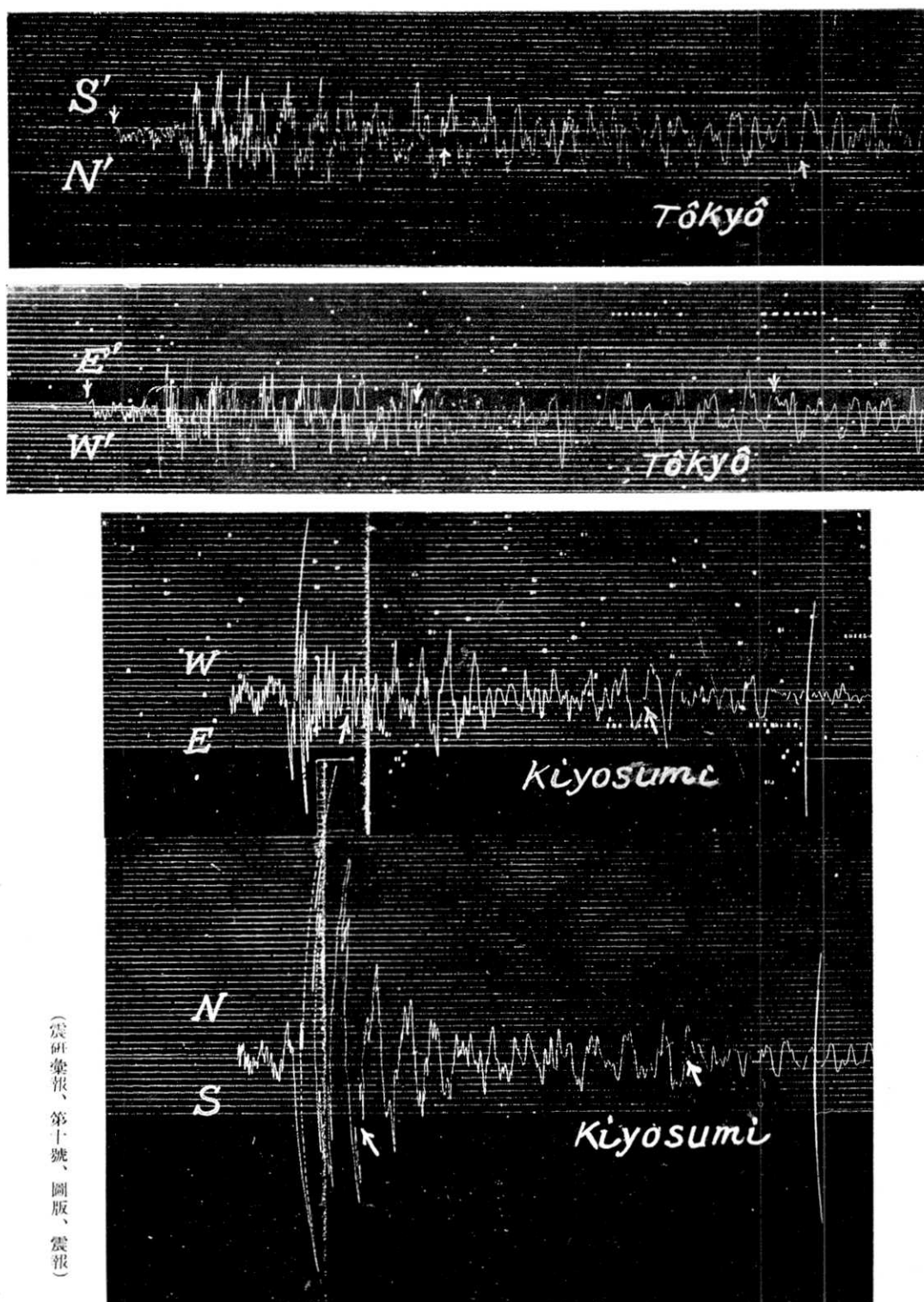


Fig. 4. Tōgane and Kiyosumi observations of the earthquake of Oct. 3, 1931.

(Small arrow indicates minute-break.)

Instrumental constants:	Tōgane	Kiyosumi
	Natural period=7 s	Natural period=7 s
	Magnification=50	Magnification=50
	Damping ratio=1.5	Damping ratio=1.5



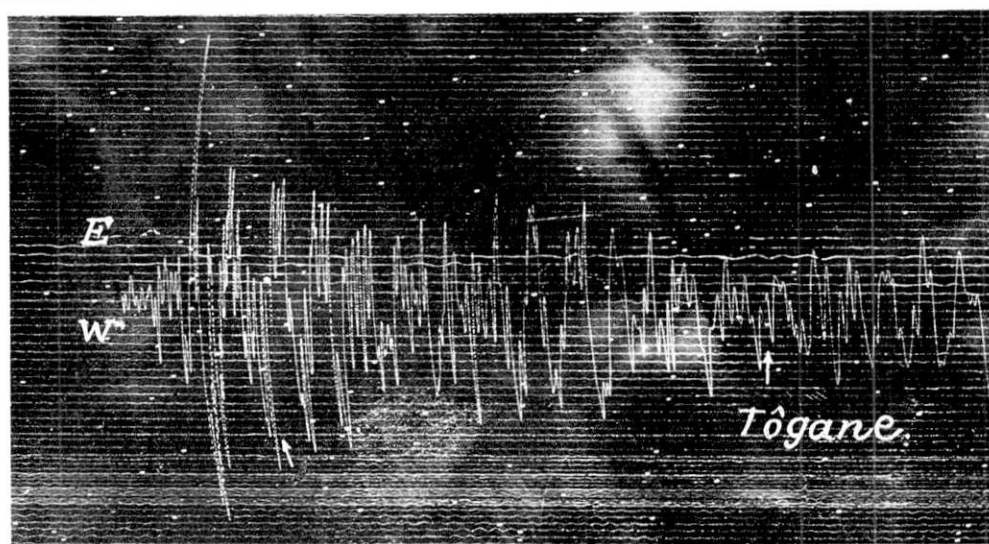
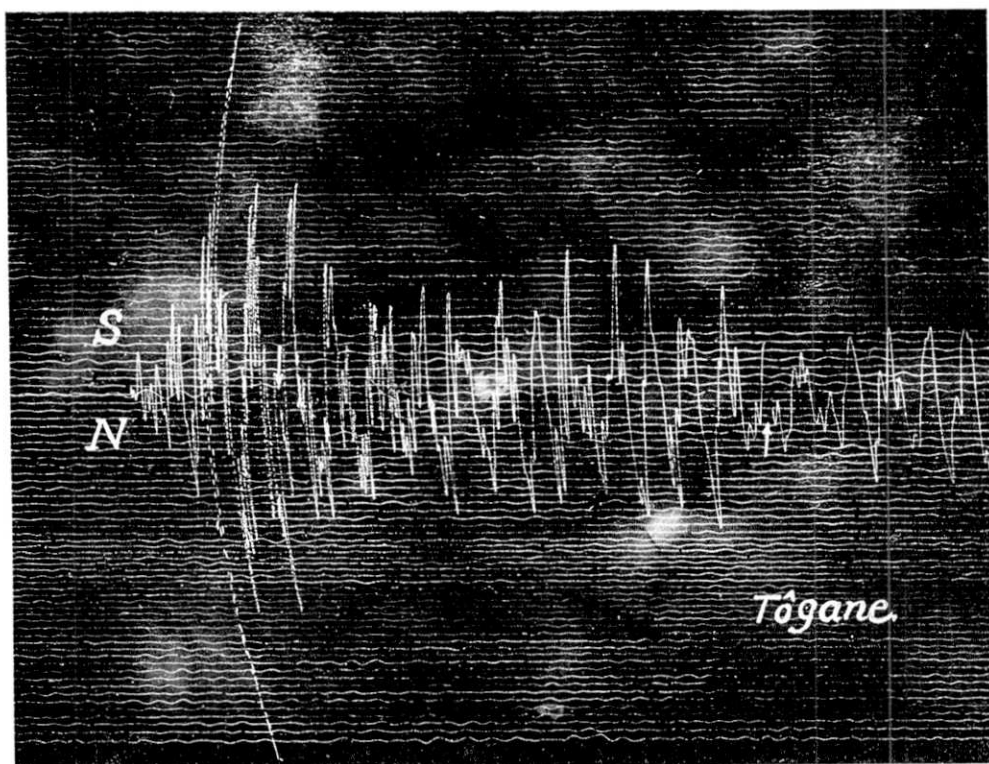
(震研彙報、第十號、圖版、震報)

Fig. 5. Tōkyō and Kiyosumi observations of the earthquake of Nov. 12, 1931.

(Small arrow indicates minute-break.)

Instrumental constants: Tōkyō ( $N' = N 13^\circ W$ ,  $S' = S 13^\circ E$ ,  
 $E' = N 77^\circ E$ ,  $W' = S 77^\circ W$ .) Instrument = No. 4.

Kiyosumi. (See Fig. 4.)



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Fig. 6. Tōgane observation of the earthquake of Nov. 12, 1931.

(Small arrow indicates minute-break.)

Instrumental constants: (See Fig. 4.)

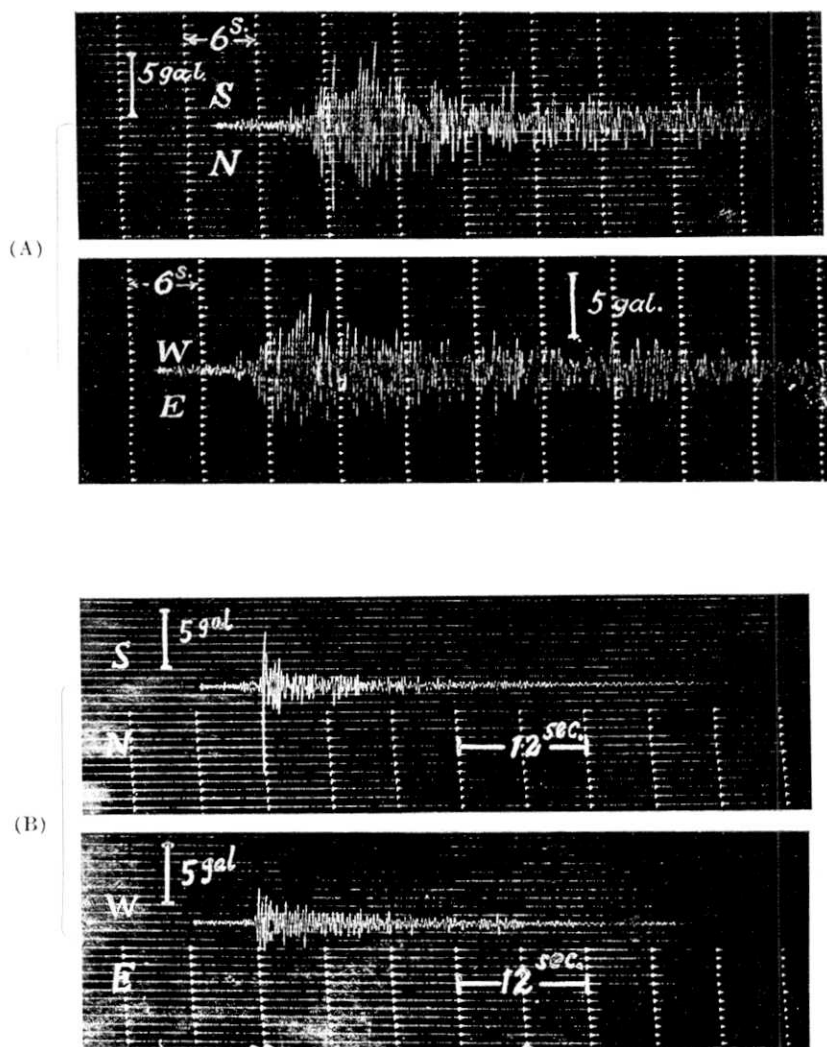
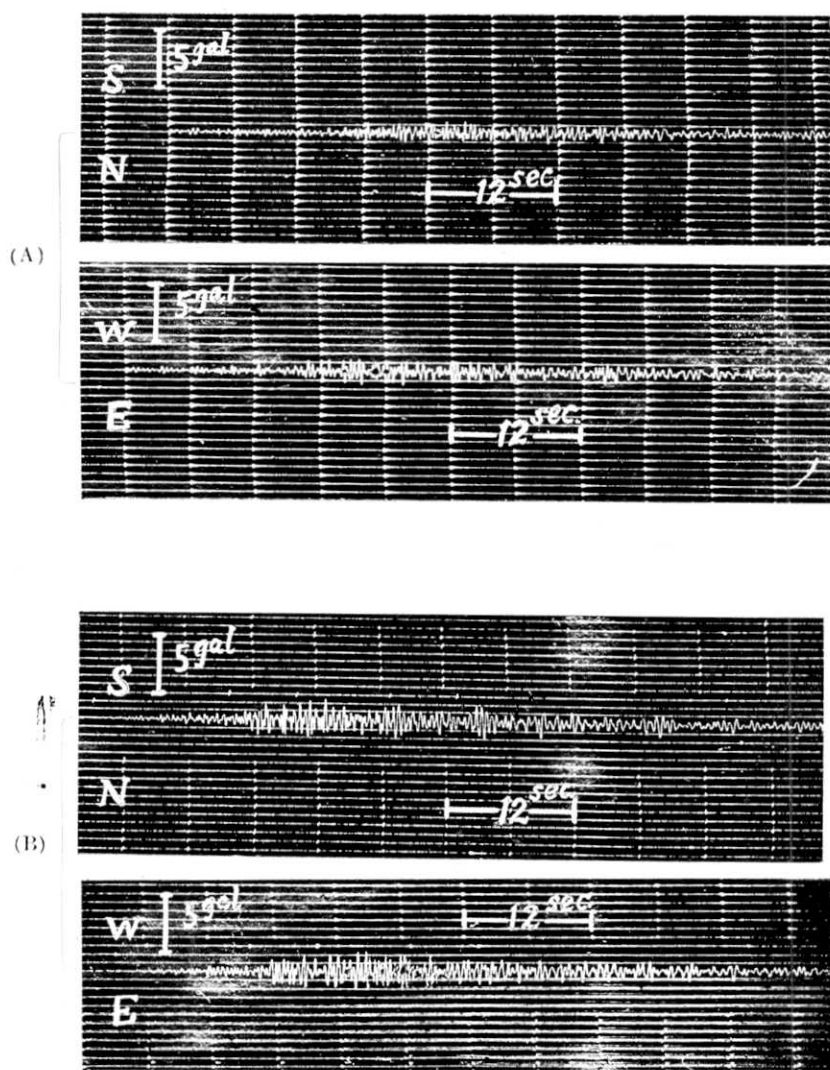


Fig. 7. Tōkyō observations of the earthquakes of Oct. 3 (A) and Oct. 13, 1931 (B).  
Ishimoto acceleration seismograph diagrams.





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Fig. 8. Tōkyō Observations of the earthquakes of Oct. 30 (A) and Nov. 12 1931 (B).  
Ishimoto acceleration seismograph diagrams.