20. Seismometrical Report.

地震觀測報告

(Earthquake Research Institute, Tôkyô, Japan.)

(July 1—September 30, 1931.)

(1) Sensible earthquakes in Tôkyô for the period July 1—September 30, 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. = East-West component.
2A = Range of motion.
T = Period of earthquake motion.
λ = Longitude.
φ = Latitude.
D = Depth of focus.

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

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direction of initial motion	Epicentre		D	Intensity
				Prel. tr.	Total	N. S.		E. W.			λ (E)	φ (N)		
						2A	T	2A	T					
			h m s	s	m	mm	s	mm	s				km	
41	Tôkyô	July 1	14 52 23·9	8·6	4	0·455	0·67	0·391	0·78		140°16	35°90	60	I
	Kamakura		14 52 28·4	10·0	3	0·086	0·57	0·072	0·48					
	Misaki			11·6	4	0·079	0·6	0·063	0·4					
	Kiyosumi			11·4	3	0·020	0·4	0·034	0·4					I
	Titibu			13·7	3	0·016	0·8	0·024	0·4					
	Tôgane			9·2	3	0·040	1·0	0·068	1·0					
	Tukuba		14 52 22·3	8·7	4									I
	Mitaka													

(*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.			λ (E)	φ (N)		
						2A	T	2A	T					
			h m s	s	m	mm	s	mm	s				km	
42	Tôkyô	July 2	7 47 12·8	16·9	3	0·125	0·5	0·112	0·4		139°60	34°95		I
	Kamakura		7 47 10·0	14·2	2	0·034	0·7	0·046	0·7					
	Misaki			—	2	0·012	0·3	0·025	0·3					
	Kiyosumi			15·8	3	0·008	0·4	0·020	0·4					
	Titibu			—										
	Tôgane			18·6	2	0·014	0 3	0·010	0·2					
	Tukuba			—										
	Mitaka													
43	Tôkyô	8	5 46 24·7	8·3	5	0·420	0·68	0·570	0·68	N67°W	139·32	35·84	40	II
	Kamakura			6·3	3	0·250	0·60	0·176	0·60	N34°E,d				II
	Misaki			—										
	Kiyosumi			—										
	Titibu			7·0	4	0·106	0·30	0·112	0 30					
	Tôgane			14·3	5	0·044	0·60	0·034	0·60					
	Tukuba		5 46 27·5	10·2	4									
	Mitaka													
44	Tôkyo	10	14 59 16·6	11·4	6	0·186	1·13	0·260	1·13		140·65	35·66	14	I
	Kamakura													
	Misaki			13·2	4	0·108	1·3	0·075	0·6					
	Kiyosumi			9·4	7	0·088	1·7	0·086	1·4					
	Titibu			18·2	4	0·028	1·5	0·028	1·4					
	Tôgane			7·5	8	1·030	1·5	0·800	1·4					
	Tukuba		14 59 11·3	15·6	9									
	Mitaka													
45	Tôkyô	10	22 10 41·5	12·8	13	0 842	1·30	1·762	1·67	E sl.S	140·83	35·59	26·5	II
	Kamakura		22 11 —	17·1	9	0·800	0·57	0·380	0·57	S36°W,d				II
	Misaki			15·8	5	0·440	1·4	0·550	1·8					
	Kiyosumi			10·3	12	0·350	3·3	0·400	2·8					
	Titibu			22·8	6	0·160	1·3	0·156	0·6					
	Tôgane			8·0	11	—	—	2·950	2·0					
	Tukuba		22 10 38·4	15 6	13									II
	Mitaka													
46	Tôkyô	19	21 23 57·5	20·7	10	0·137	0·48	0·106	0·42		140·41	37·31		I
	Kamakura		21 23 —	20·7	6	0·054	0·55	0·066	0·55					
	Misaki			31·0	7	0·035	0 50	0·030	0·60					
	Kiyosumi			28·5	7	0·060	1·2	0·024	0·80					
	Titibu			21·0	8·5	0·188	1·0	0·270	1·20					
	Tôgane			20·0	8	0·044	0·6	0·064	0·6					
	Tukuba		21 23 45·0	16·2	10									I
	Mitaka													
47	Tôkyô	20	8 29 28·1	8·2	2	0·121	0·48	0·054	0·51		139·36	35·66		I
	Kamakura		8 29 30·0	6·5	2	0·078	0·46	0·036	0·38					
	Misaki			7·5	2	0·025	1·00	0·017	0·70					
	Kiyosumi			—										
	Titibu			8·4	1									
	Tôgane			20·0	1	0·004	1·00	0·020	0·60					
	Tukuba		8 29 37·6	12·4	2									
	Mitaka													

(*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.			λ (E)	φ (N)		
						2A	T	2A	T					
			h m s	s	m	mm	s	mm	s		°	°	km	
48	Tôkyô	July 26	10 41 19·9	8·8	7	2·475	0·74	2·365	0·75		140·09	35·85	58	III
	Kamakura		10 41 23·7	11·1	6	0·560	0·78	0·460	0·39					II
	Misaki			13·6	6	0·470	0·7	0·413	0·6					
	Kiyosumi			10·0	6	0·146	0·5	0·200	0·7					II
	Titibu			11·8	5	0·064	0·6	0·052	0·6					
	Tôgane			9·4	6	0·260	0·8	0·350	0·9					
	Tukuba		10 41 21·5	9·3	8									I
	Mitaka													
49	Tôkyô	28	11 5 42·0	10·8	15	0·333	0·95	0·329	0·94		140·25	35·95	60	II
	Kamakura		11 5 46·4	13·6	5	0·060	1·2	0·140	1·2					
	Misaki			14·4	5	0·067	1·6	0·067	1·5					
	Kiyosumi			14·7	6	0·026	0·8	0·036	1·4					
	Titibu			13·0	4	0·056	0·8	0·080	0·8					
	Tôgane			10·6	12	0·132	1·2	0·200	1·2					
	Tukuba		11 5 38·3	6·6	9									II
	Mitaka													
50	Tôkyô	28	11 27 29·2	9·9	3	0·112	0·63	0·063	0·50		139·85	36·22	46	I
	Kamakura			13·6	5	0·060	0·38	0·140	0·63					I
	Misaki			14·6	2	0·008	0·3	0·010	0·6					
	Kiyosumi			—	2	0·006	0·6	0·008	0·6					
	Titibu			11·0	1	0·008	0·3	0·004	0·2					
	Tôgane			13·1	2	0·028	0·4	0·020	0·6					
	Tukuba		11 27 25·6	7·1	2									I
	Mitaka													
51	Tôkyô	30	1 30 12·8	9·2	2·5	0·044	0·23	0·036	0·23		139·68	36·49	18	I
	Kamakura													
	Misaki			16·0	1	0·005	0·5	0·001	0·4					
	Kiyosumi			—										
	Titibu			8·5	1	0·008	0·2	0·010	0·2					
	Tôgane			13·8	1	0·004	0·3	0·002	0·2					II
	Tukuba		1 30 11·0	5·5	2									
	Mitaka													
52	Tôkyô	31	4 46 21·4	14·6	14	0·078	0·57	0·065	0·45		140·79	36·29		I
	Kamakura		4 46 24·6	22·5	5	0·020	0·36	0·030	0·36					
	Misaki			21·0	4	0·082	1·00	0·047	1·0					
	Kiyosumi			18·0	4	0·020	0·8	0·020	0·7					
	Titibu			19·4	3	0·032	0·7	0·034	1·0					
	Tôgane			12·7	7	0·040	0·6	0·060	0·8					
	Tukuba		4 46 12·5	9·6	7									I
	Mitaka													
53	Tôkyô	Aug. 10	23 34 32·0	19·8	12	0·911	1·04	0·622	1·04	N80°E,u	138·31	35·15		II
	Kamakura		23 34 24·4	17·0	9·5	0·606	0·20	1·040	0·50	N58°E				II
	Misaki			16·0	10	0·530	2·7	0·790	2·7	E,				II
	Kiyosumi			23·0	11	0·720	4·8	0·580	5·0					
	Titibu			16·0	6	0·560	3·5	0·530	2·5	S45°W				
	Tôgane			25·6	12	0·350	2·0	0·420	3·5					
	Tukuba		23 34 34·4	27·6	28									
	Mitaka													

(*to be continued.*)

List I. (*continued.*)

No.	Station	Date	Time of occurrence	Duration Prel. tr.	Duration Total	Maximum motion N.S. 2A	Maximum motion N.S. T	Maximum motion E.W. 2A	Maximum motion E.W. T	Direction of initial motion	Epicentre λ (E)	Epicentre φ (N)	D	Intensity
			h m s	s	m	mm	s	mm	s		°	°	km	
54	Tôkyô	Aug. 18	14 40 42·3	20·5	30	1·720	2·6	1·130	3·1		141·00	36·15		I
	Kamakura		14 40 47·8	24·3	15	0·474	1·7	0·596	1·0					II
	Misaki													
	Kiyosumi			20·0	14	0·540	3·8	0·400	2·5					
	Titibu			23·5	11	0·170	1·8	0·170	1·6					
	Tôgane			13·6	21	0·640	1·1	0·450	1·5					II
	Tukuba		14 40 32·5	9·4	11									II
	Mitaka													
55	Tôkyô	19	8 43 45·2	7·1	3	0·054	0·30	0·082	0·20		140·14	35·86	40	I
	Kamakura		8 43 49·0	13·1	2	0·028	0·49	0·028	0·49					
	Misaki			14·1	3	0·014	0·5	0·023	1·0					
	Kiyosumi			14·8	2	0·004	0·3	0·004	0·3					
	Titibu													
	Tôgane			8·0	2	0·016	0·4	0·012	0·4					
	Tukuba		8 43 41·4	6·0	2									I
	Mitaka													
56	Tôkyô	27	8 49 32·7	8·7	4	0·348	0·62	0·245	0·76	N81°E	140·23	35·75	50	II
	Kamakura		8 49 35·9	9·4	3	0·026	0·28	0·038	0·34					
	Misaki			10·9	3	0·050	0·5	0·028	0·3					
	Kiyosumi			11·4	3	0·016	0·4	0·028	0·8					
	Titibu			8·0	2·5	0·008	0·4	0·008	0·5					
	Tôgane													
	Tukuba		8 49 29·8	8·1	3									I
	Mitaka													
57	Tôkyô	Sept. 7	5 35 5·2	8·3	7	1·453	0·52	1·160	0·59	N69°E,d	139·91	35·77	60	III
	Kamakura		5 35 6·8	9·4	5	0·580	0·45	0·490	0·45					II
	Misaki			10·4	5	0·395	0·75	0·325	0·75	N25°E				II
	Kiyosumi		5 35 5·5	9·8	6	0·120	0·56	0·232	0·56					II
	Titibu			12·2	5	0·110	0·54	0·132	0·77					
	Tôgane			9·6	5	0·180	0·50	0·170	0·56					II
	Tukuba		5 35 0·4	9·6	6									II
	Mitaka													
58	Tôkyô	9	4 9 31·4	24·5	30	1·480	2·9	1·480	3·5	S50°W,u	141·43	36·70		I
	Kamakura		4 9 34·2	25·8	15	2·46	5·6	0·56	2·8					I
	Misaki			33·0	30	0·367	1·9	0·565	2·8					II
	Kiyosumi			27·3	30	0·530	2·58	1·150	4·8					
	Titibu			29·7	20	0·310	1·62	0·230	2·37					
	Tôgane			21·3	30	0·590	2·85	0·490	3·45					II
	Tukuba		4 9 21·4	32·0	40									
	Mitaka													
59	Tôkyô	16	21 43 23·4	12·0	35	8·340	2·61	2·000	0·45	E sl.N,u	138·82	35·55	20	III
	Kamakura		21 43 16·3	8·7	17	7·85	0·81	12·800	0·81	N82W,d				III
	Misaki			10·0	20					N45°W				III
	Kiyosumi			17·0	25	2·200	4·7	1·90	4·7					III
	Titibu			7·5	20			3·04	2·0	S23°W				III
	Tôgane			18·0	30			2·10	2·3					III
	Tukuba		21 43 20·5	15·8	22									II
	Mitaka													

(*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.			λ (E)	φ (N)		
						2A	T	2A	T					
			h m s	s	m	mm	s	mm	s				km	
60	Tôkyô	Sept. 18	15 13 45·4	11·6	7	1·720	0·76	1·240	0·34	N77°E,u	138°91	35°54		II
	Kamakura		15 13 44·0	7·9	7·5	2·400	0·5	6·000	0·5	N78°W,d				III
	Misaki			10·7	6	0·540	0·7	1·100	1·2					II
	Kiyosumi													
	Titibu			8 0	5	0·124	0·4	0·280	0·5					
	Tôgane			15·5	8	0·164	0·8	0·080	0·7					II
	Tukuba		15 13 54·1	15·4	8									I
	Mitaka													
61	Tôkyô	21	11 20 10·3	9·7	40	54·000	6·8	25·000	5·8	S71°E,u	139·12	36·0	16	V
	Kamakura		11 20 15·0	12·5	22	32·000	1·1	8·500	1·1	S8°E,u				IV
	Misaki			14·2						S22°E				IV
	Kiyosumi		11 20 21·0	17·8						S25°E				III
	Titibu			2·8						N48°E				V
	Tôgane			15·0						S46°E				IV
	Tukuba		11 20 11·9	10·0										III
	Mitaka		11 26 33·8	8·0						S38°E				V
62	Tôkyô	21	15 21 37·3	9·6	5	0·080	0·35	0·060	0·35		139·18	35·99	16	I
	Kamakura													
	Misaki			14·5	4	0·050	0·51	0·037	0·51					
	Kiyosumi			18·0	6	0·020	0·91	0 024	0·91					
	Titibu			3·2				0·350	0·37					
	Tôgane			16·1	6	0·100	0·85	0·084	0·85					I
	Tukuba		15 21 45·0	9·4	3									II
	Mitaka			7·9	5	0·122	0·20	0·130	0·2					I
63	Tôkyô	21	15 49 13·0	9·6	7	0·166	0·40	0·062	0·40		139·19	36·01	12	I
	Kamakura		15 49 17·8	12·5	5	0·110	0·65	0·098	0·52					
	Misaki			15·0	4	0·067	1·16	0·083	0·94					
	Kiyosumi			18·2	6	0·032	0·91	0·020	0·91					
	Titibu			2·6				0·890	0·35					
	Tôgane			16·0	6	0·084	0·90	0·120	0·90					I
	Tukuba		15 49 20·3	9·8										I
	Mitaka			7·9	7	0·156	0·37	0·140	0·37					I
64	Tôkyô	23	21 46 18·5	9·0	7	0·060	0·37	0·088	0·37		139·17	36·01	17	I
	Kamakura		21 46 24·6	11·2	5									
	Misaki			14·2	5	0·032	1·23	0·040	0·87					
	Kiyosumi		21 46 31·8	16·6	6	0·014	0·47	0·016	0·75					
	Titibu			3·2	2	0·200	0·30	0·264	0·40					
	Tôgane													
	Tukuba		21 46 19·1	8·6	3									I
	Mitaka			7·7	6	0·160	0·60	0·208	0·40					
65	Tôkyô	24	1 22 41·1	9·1	10	0·120	0·26	0·150	0·35	S58°E	139·10	36·02	30	I
	Kamakura		1 22 45·7	9·9	5	0·080	0·37	0·140	0·62					
	Misaki			12·8	6	0·065	0·52	0·046	0·52					
	Kiyosumi			18·2	6	0·030	0·49	0·020	0·49					
	Titibu			4·0	2	0·308	0·34	0·288	0·33	N62°E				
	Tôgane			15·7	7	0·162	0·77	0·118	0·77					I
	Tukuba		1 22 41·7	8·3	3·5									
	Mitaka			7·1	7	0·160	0·32	0·108	0·43					

(*to be continued.*)

List I. (*continued.*)

No.	Station	Date	Time of occurrence	Duration Prel. tr.	Duration Total	Maximum motion N.S. 2A	Maximum motion N.S. T	Maximum motion E.W. 2A	Maximum motion E.W. T	Direction of initial motion	Epicentre λ (E)	Epicentre φ (N)	D	Intensity
			h m s	s	m	mm	s	mm	s		°	°	km	
66	Tôkyô	Sept. 24	13 26 25·0	8·5	8	0·485	0·78	0·466	0·78		140·04	35·98	10	I
	Kamakura		13 26 28·4	11·8	5	0·070	0·38	0·060	0·38					
	Misaki			11·9	5	0·063	0·58	0·090	0·43					
	Kiyosumi		13 26 26·1	13·6	5	0·040	0·56	0·036	0·56					I
	Titibu			14·3	3	0·052	0·84	0·048	0·53					
	Tôgane			11·0	7	0·070	0·43	0·116	0·43					I
	Tukuba		13 26 21·9	7·5	3									
	Mitaka			10 6	5	0·166	0·29	0·120	0·29					I
67	Tôkyô	24	21 11 26·3	9·8	5	0·058	0·34	0·076	0·36	S58°E	139·11	36·01	18	I
	Kamakura		21 11 32·4	11·5	5	0·060	0·47	0·036	0·39					
	Misaki			15·0	5	0·025	0·45	0·042	0·56					
	Kiyosumi			18·3	5	0·001	0·84	0·016	1·02					
	Titibu			2·9	2			0·392	0·43					
	Tôgane			14·9	7	0·086	0·69	0·054	0·69					I
	Tukuba													
	Mitaka			7·8	7	0·116	0·40	0·136	0·4					II
68	Tôkyô	26	12 37 43·4	9·7	2	0·070	0·27	0·030	0·27		139·08	36·05	17	I
	Kamakura		12 37 44·8	11·4	2	0·040	0·47	0·030	0·47					
	Misaki			15·6	4	0·015	0·53	0·018	0·53					
	Kiyosumi		12 37 50·8	17·7	2	0·008	0·58	0·004	0·58					
	Titibu			2·9	1·5	0·092	0·30	0·110	0·35					
	Tôgane			15·4	3	0·036	0·84	0·026	0·85					
	Tukuba		12 37 43·6	9·6	2									I
	Mitaka			8 0	3	0·062	0·38	0·036	0·38					
69	Tôkyô	28	4 50 40·0	7·9	7	0·650	0·7	0·590	0·7		139·76	36·10	40	II
	Kamakura		4 50 44·2	11·7	6	0·050	0·5	0·240	0·5					II
	Misaki			14·5	8	0·233	1·3	0·150	2·4					
	Kiyosumi			15·6	5	0·200	3·0	0·170	2·0					
	Titibu			9 0	4	0·180	0·9	0·072	0·5					
	Tôgane			11·8	4	0·096	1·0	0·146	0·6					
	Tukuba		4 50 38·3	5·5	5									II
	Mitaka			9·0	7	0·160	0·86	0·530	0·86					II
70	Tôkyô	28	13 54 27·6	8·7	13	0·420	1·13	0·580	1·13	S40°E,u.	139·18	35·96	25	II
	Kamakura		13 54 31·1	11·6	8·5	0·260	0·8	0·840	0·8	S10°E				II
	Misaki			16·2	10	0·700	3·0	0·241	1·5					
	Kiyosumi			18·2	12	0·220	3·5	0·120	1·5					
	Titibu			4·0	7	1·640	0·7	2·460	0·6					
	Tôgane			15·4	9	0·900	1·6	1·000	2·4					
	Tukuba		13 54 37·4	8·4	12					S31°W				I
	Mitaka		13 54 27·5	8·3	10	0·480	0·42	0·730	0·42	S30°E,u.				II

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

The most important distant earthquake observed during this period was the Sin Kiang earthquake of August 10, 1931. A pair of Imamura long period (3-min.) horizontal pendulums gave the following

results[1]:

Phase	Time			Period	Amplitude		Azimuth
					N. S.	E. W.	
	h	m	s	s	μ	μ	
P	21	26	12	33	−30	50	S 59° E
			〃	8	26	33	S 52° E
PP		27	31				
PPP		28	1				
S		32	10	54	−2000	4700	S 67° E
SS		34	28	88	−3000	0	due S
L		35	16	90	22000	10400	N 25° E
L		36	46	48	20700	23400	N 48° E
L		37	34	42	22700	10000	N 24° E
L		38	16	34	15000	16000	N 47° E
L		38	50	31	18700	11800	N 31° E
							(mean N 35° E)
M		42	15	13	8500	−11000	N 52° W
M		42	38	13	8400	−13800	N 59° W
M		42	51	12	7200	− 9600	N 53° W
							(mean N 55° W)

Deducing from the duration of the preliminary tremors the epicentral distance becomes 4300 kms. The initial phase P gives S 59° E. Thus epicentre lies at a point 89° E, 45° N, that is, in the northern part of Sin Kiang, China. (See Fig. 14).

Note on the strong Saitama earthquake of September 21, 1931.

The earthquake of September 21, 1931, was the strongest experienced in Tôkyô since January of this year.

Intensity of the earthquake.

According to the Ishimoto Acceleration seismograph diagrams (Fig. 12) obtained at the Earthquake Research Institute the intensity of motion, or the maximum component accelerations were as follows:

N. S. component	55·5 gal.?
E. W. component	74·6 gal.

which are approximately equal to 1·5 times of those on the occasion of the strong earthquake of June 17, 1931. (See Seism. R., Jan.-March, 1931.)

1) A. Imamura, "The world-shaking earthquake of August 10, 1931, as observed with a three-minute horizontal pendulum," *Japanese Journ. Astron. and Geophys.*, Vol. IX, No. 1 (1931).

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

Station	Duration of preliminary tremors	Direction of initial motion
Tôkyô	9·7 sec.	S 71° E up
Kamakura	12·5	S 8° E up
Misaki	14·2	S 22° E
Kiyosumi	17·8 ?	S 25° E
Titibu	2·8 ?	N 48° E
Tôgane	15·0	S 45° E
Tukuba	10·0 ?	
Mitaka	8·0 ?	S 38° E
Itô	15·6	Due S
Koyama	9·1	S slight W
Yosiwara	13·8	N 11° E
Tanna	14·6	S slight W up

Earthquake Damage.

The following list gives the damage in four prefectures which are situated near the seismic origin.

Prefecture	Killed	Wounded	Totally collapsed house and godown	Partially collapsed house and godown	Broken chimney
Saitama	11	122	169	262	82
Gunma	5	30	33	5	48
Ibaraki		1	2	1	1
Tôkyô		1			

(N. Nasu and Ch. Yasuda.)

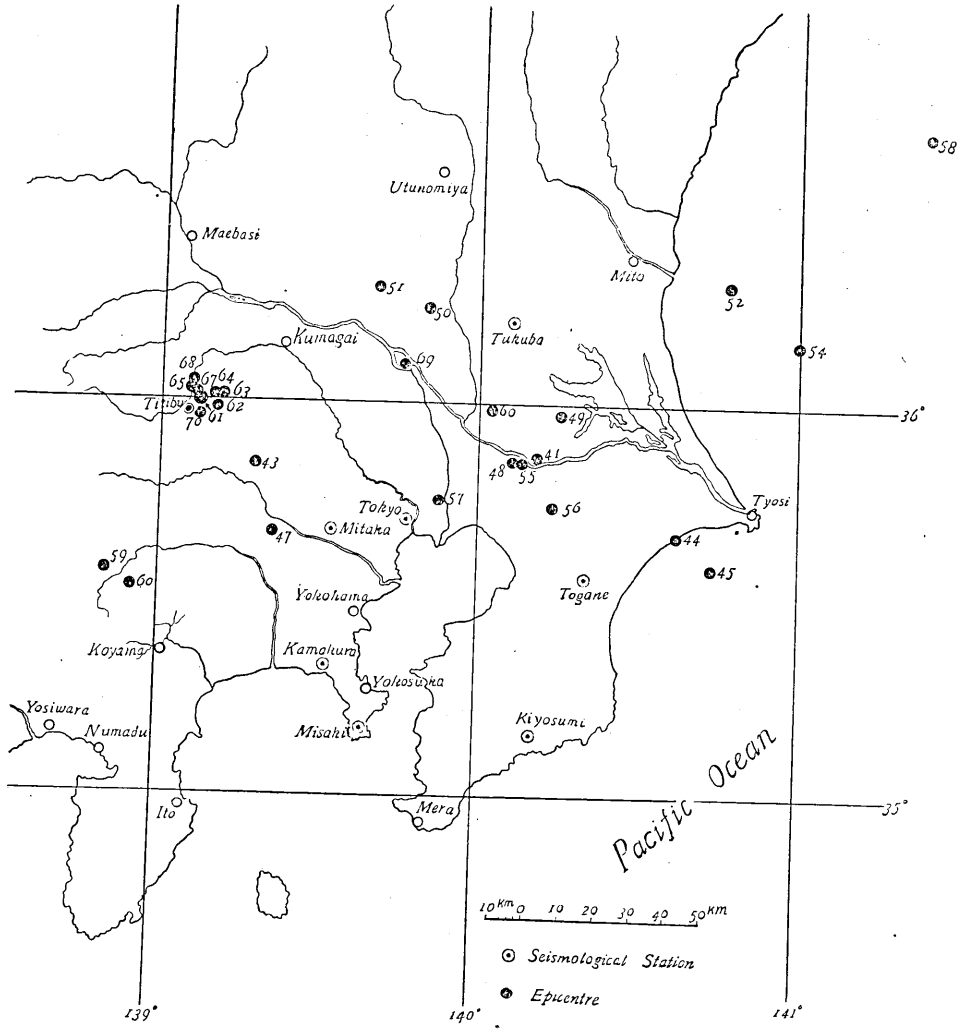
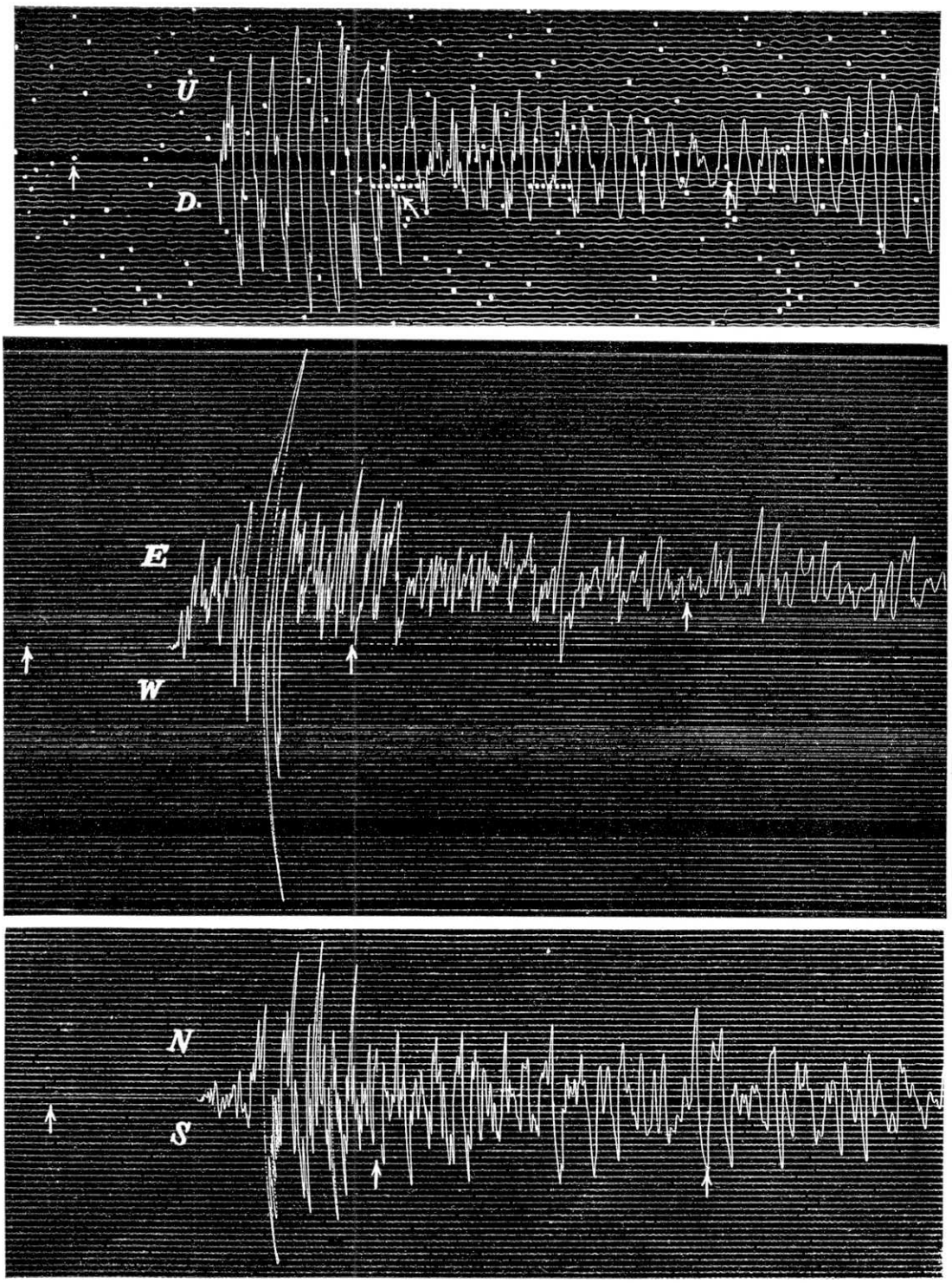


Fig. 1. Distribution of the epicentres of the earthquakes that originated within 160 kms. from Tôkyô and felt there during the period July 1-September 30, 1931. (Figures attached to each epicentre indicate the earthquake number.)

Instrument: No. 5.

Instrumental constants:

Component	Natural period	Magnification	Damping ratio
N.S.	7 sec.	50	1·50
E.W.	7	50	1·50
Vert.	7	28	1·50



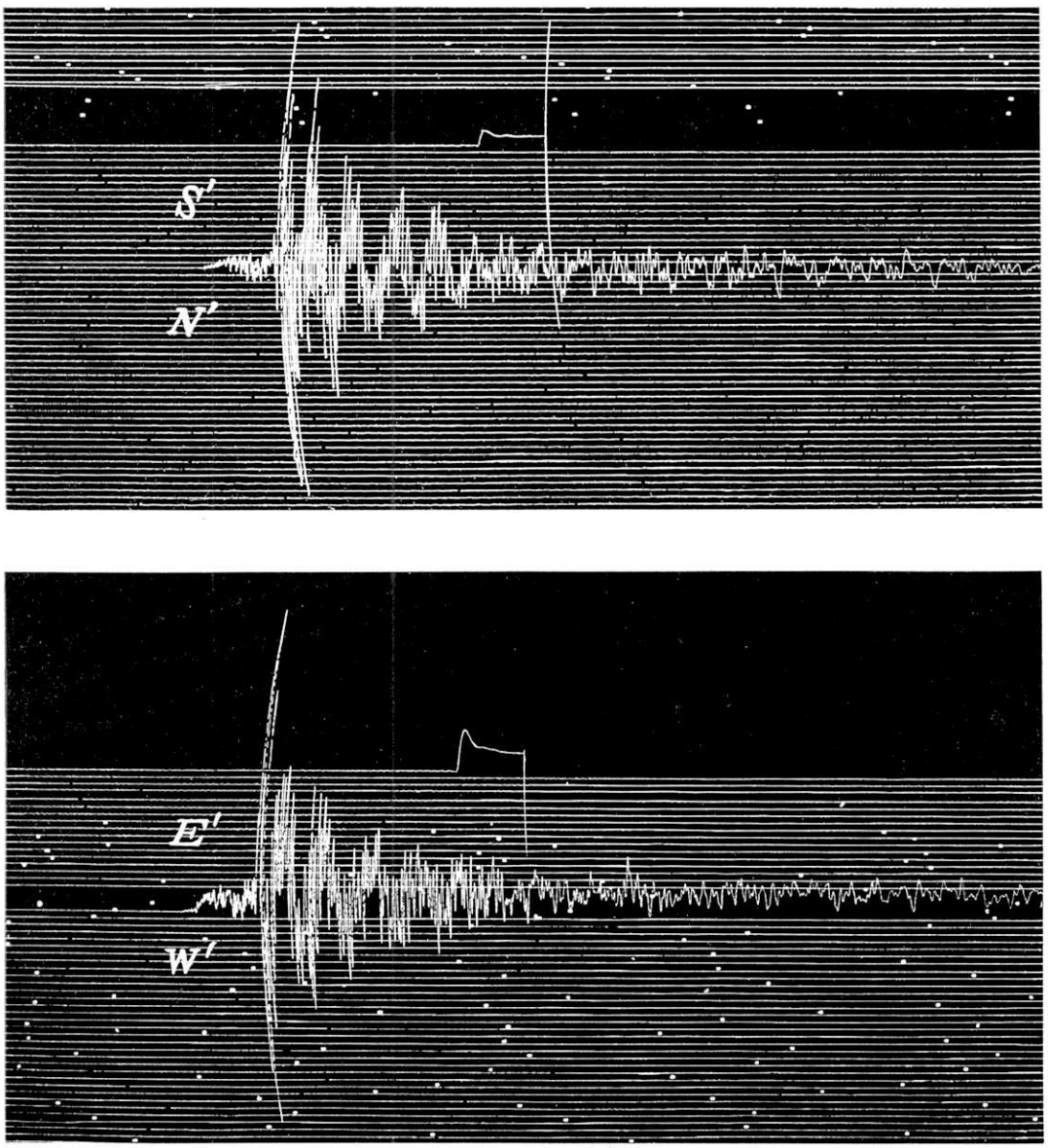
(*Natural size of the original diagrams.*)
Small arrow indicates the minute-break.

Fig. 2. Tôkyô Observation of the Earthquake of July 10, 1931.

Instrument : No. 4.

Instrumental constants :

Component	Natural period	Magnification	Damping ratio
E.W.	7 sec.	50	1·50
N.S.	7	50	1·50



N′ = N 13° W, S′ = S 13° E.
E′ = N 77° E, W′ = S 77° W.

(*Natural size of the original Diagrams.*)

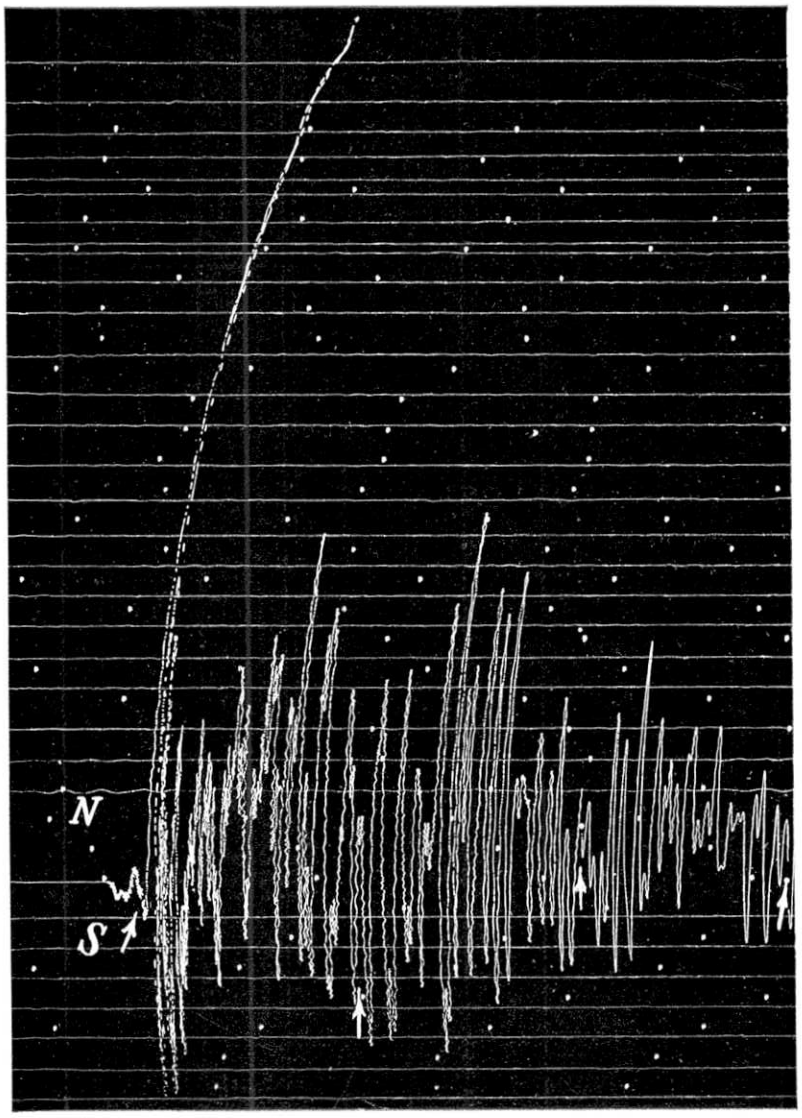
Fig. 3. Tôkyô Observation of the Earthquake of September 7, 1931.

(震研彙報、第十號、圖版、震報)

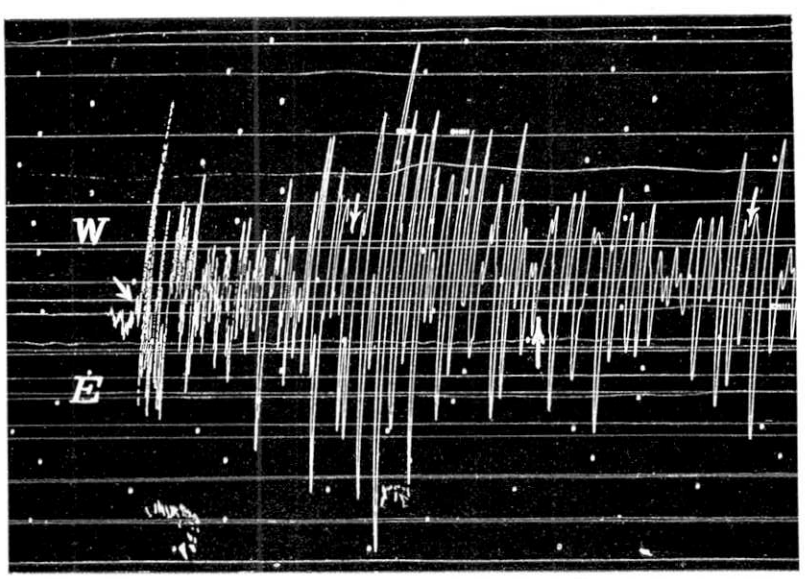
Instrument :
N. S. Component=No. 15.
E.W. Component=No. 14.

Instrumental constants :

Component	Natural period	Magnification	Damping ratio
N S.	60 sec.	20	2·0
E.W.	60	15	3·2



N.S. Component.



E.W. Component.

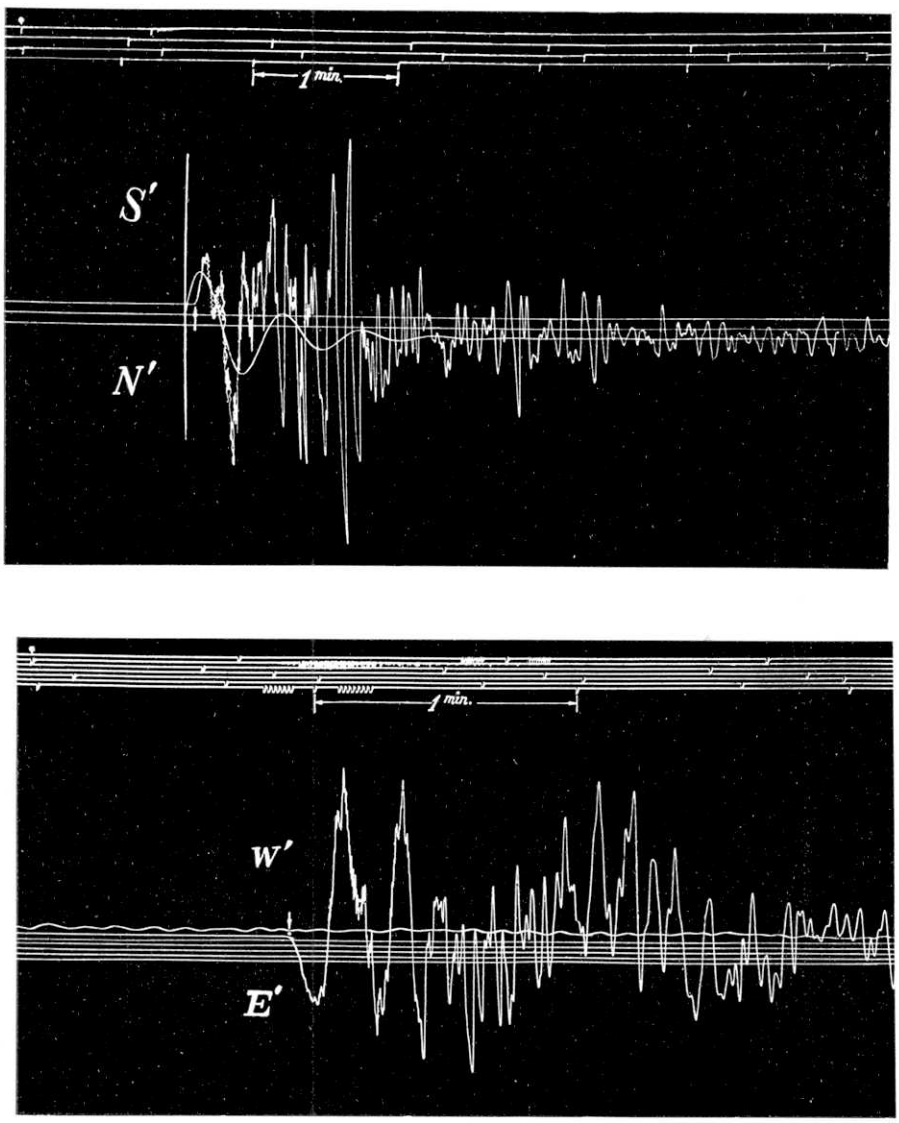
(*Natural size of the original diagrams.*)
Small arrow indicates the minute-break.

Fig. 4. Tôkyô Observation of the Earthquake of September 16, 1931.

Instrument : No. 3.

Instrumental constants :

Component	Natural period	Magnification	Damping ratio
N.S.	60 sec.	1·5	1·50
E.W.	60	1·5	1·50



(震研彙報、第十號、圖版、震報)

(*Reduced to 2/3 of the original diagrams.*)

N′ = N 13° W, S′ = S 13° E.

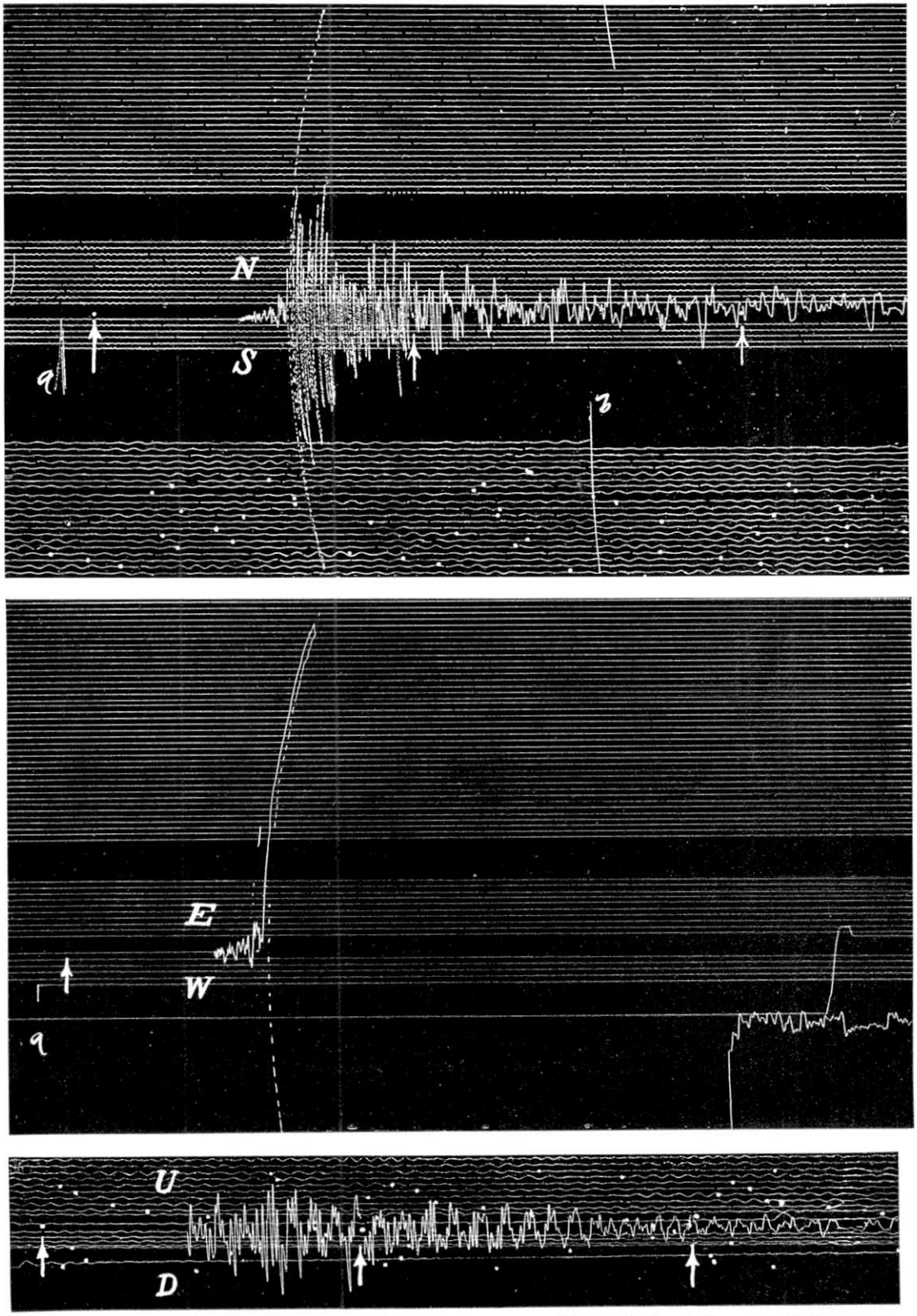
E′ = N 77° E, W′ = S 77° W.

Fig. 5. Tôkyô Observation of the Strong Saitama Earthquake of September 21, 1931.

Instruments: No. 5.

Instrumental constants:

Component	Natural period	Magnification	Damping ratio
N.S.	7 sec.	50	1·50
E.W.	7	50	1·50
Vert.	7	28	1·50

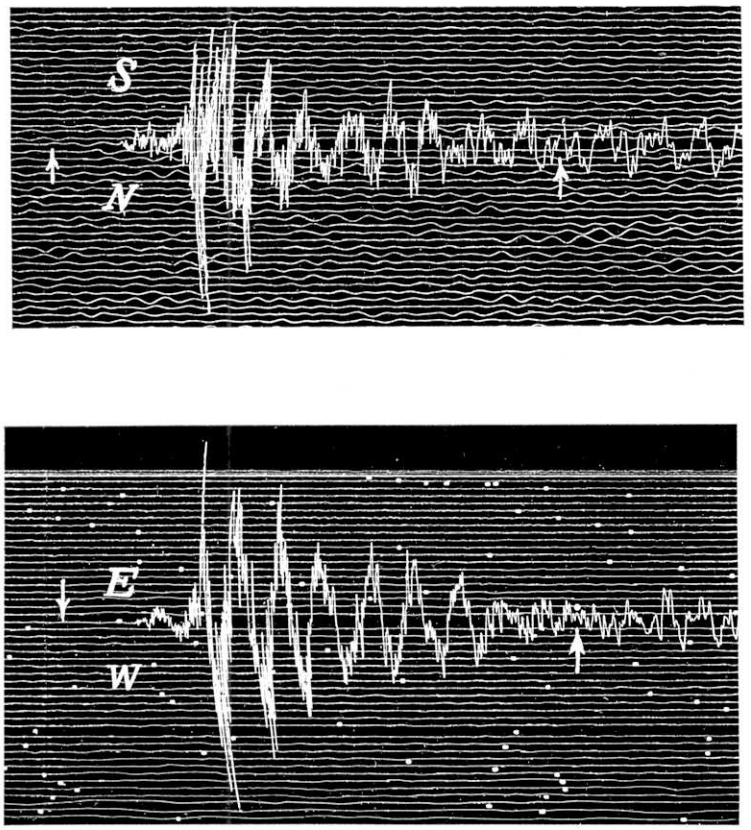


(*Natural size of the original diagrams.*)
Small arrow indicates the minute-break.

Fig. 6. Tôkyô Observation of the Earthquake of September 28, 1931.

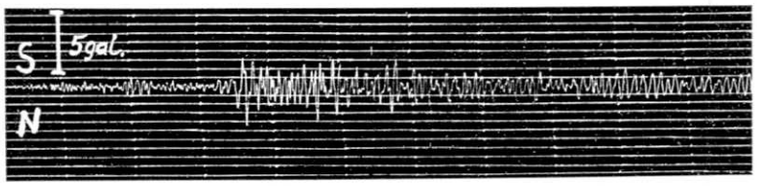
Instrument: No. 5.
Instrumental constant:

Component	Natural period	Magnification	Damping ratio
N.S.	7 sec.	50	1·50
E.W.	7	50	1·50

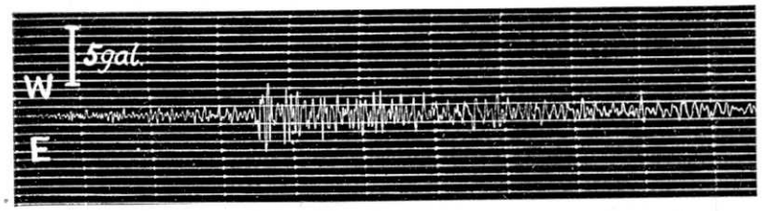


(*Natural size of the original diagrams.*)
Small arrow indicates the minute-break.

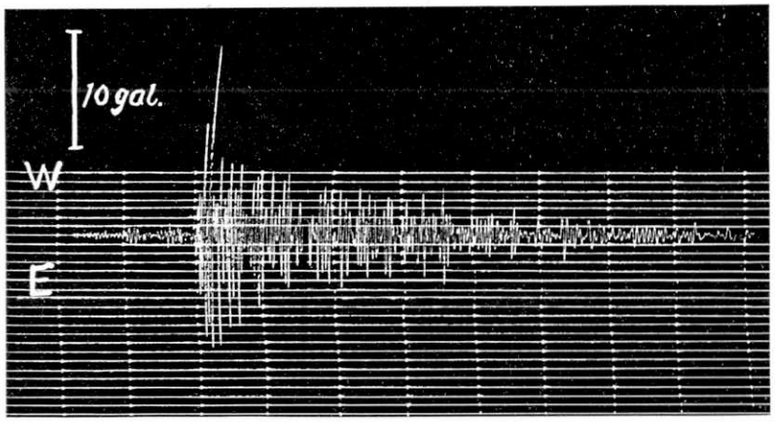
Fig. 7. Tôkyô Observation of the Earthquake of September 28, 1931.



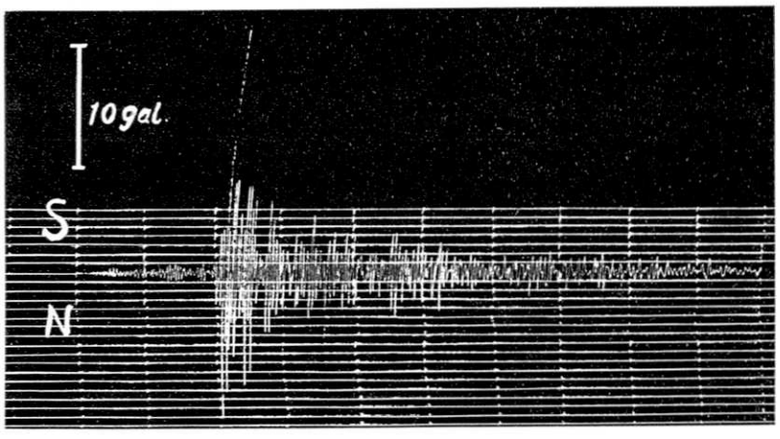
N.S. Component.



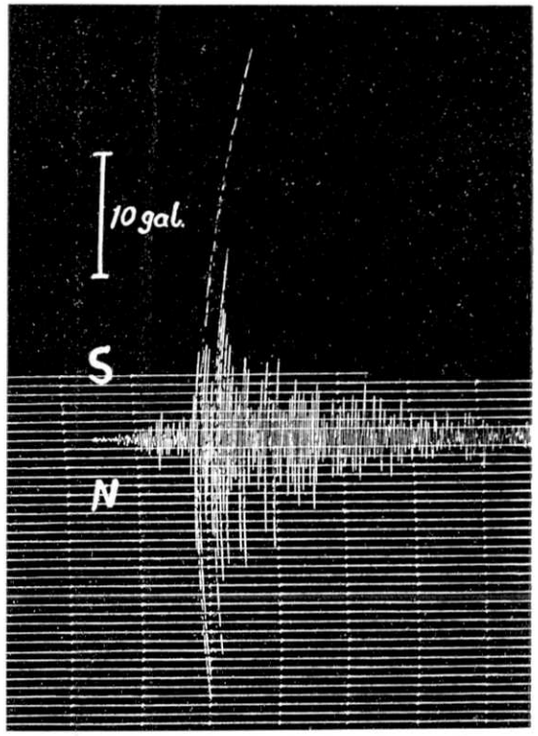
E.W. Component. Fig. 8.



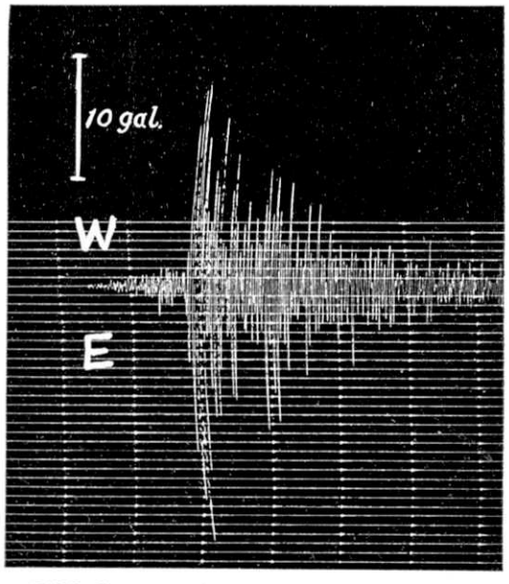
N.S. Component.



E.W. Component. Fig. 11.



N.S. Component.



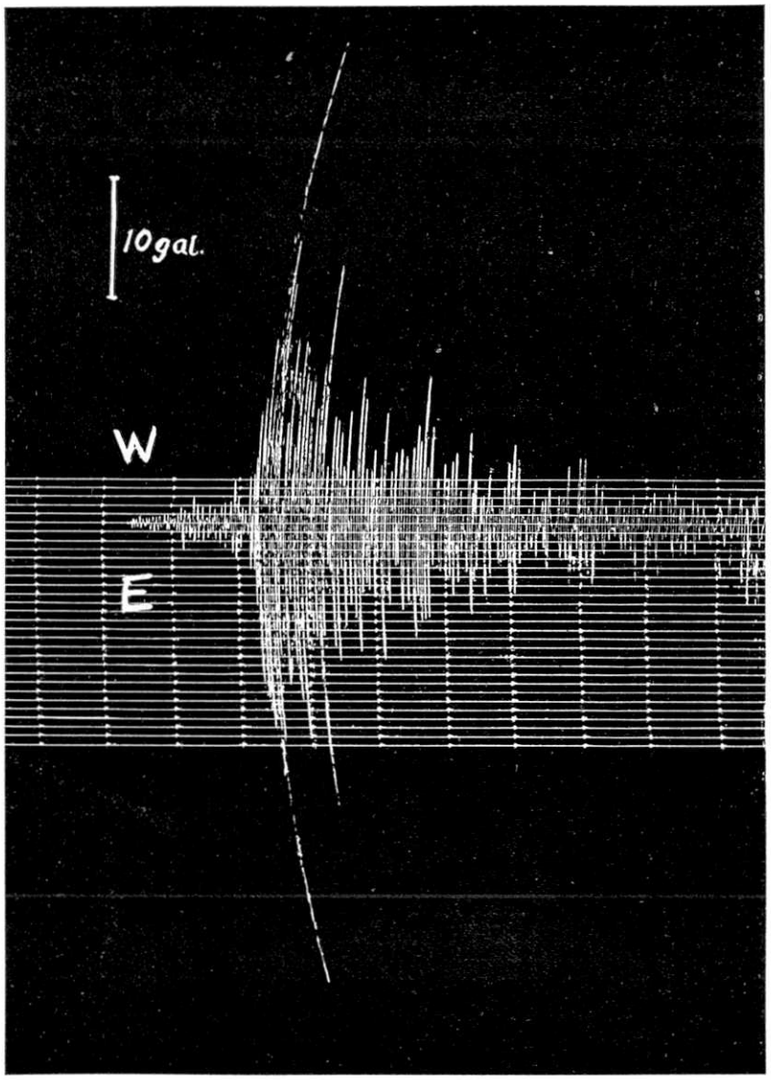
E.W. Component.

Fig. 8. Tôkyô Observation of the Earthquake of August 10, 1931
Fig. 11. „ „ „ September 18, 1931.

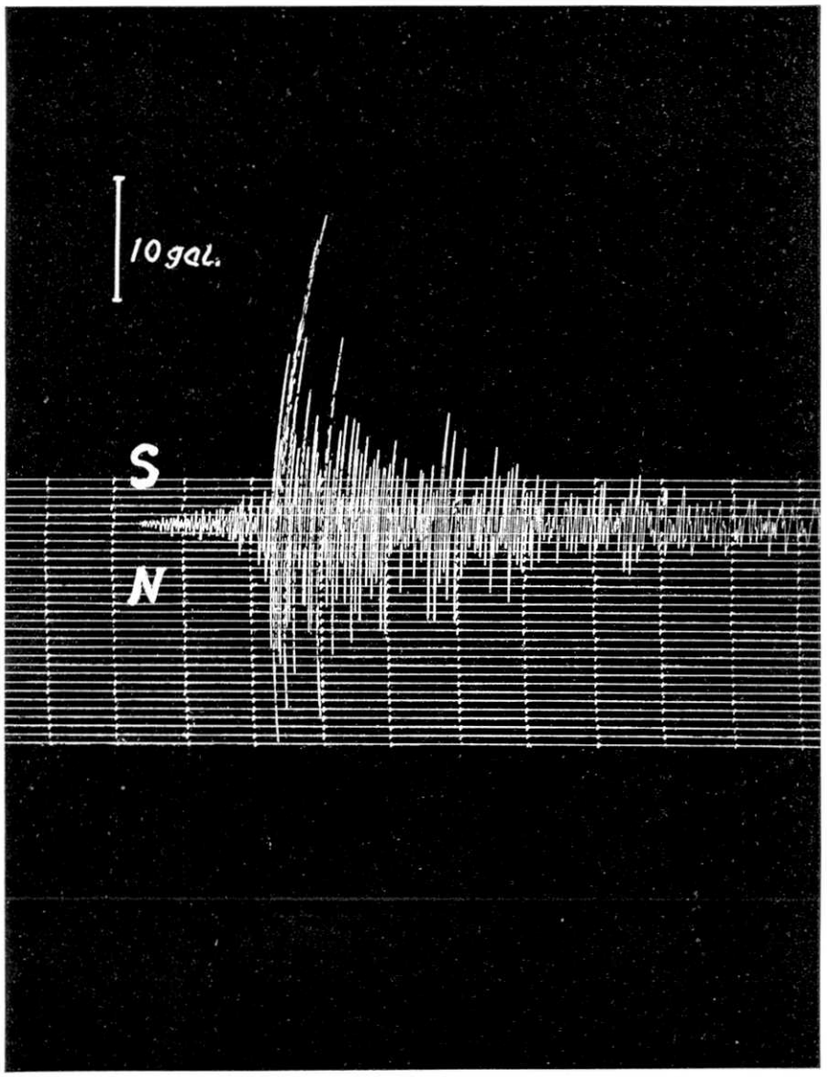
Fig. 9. Tôkyô Observation of the Earthquake of September 7, 1931.

Ishimoto Acceleration Seismograph Diagrams.

(Time between consecutive two marks=6 sec.)

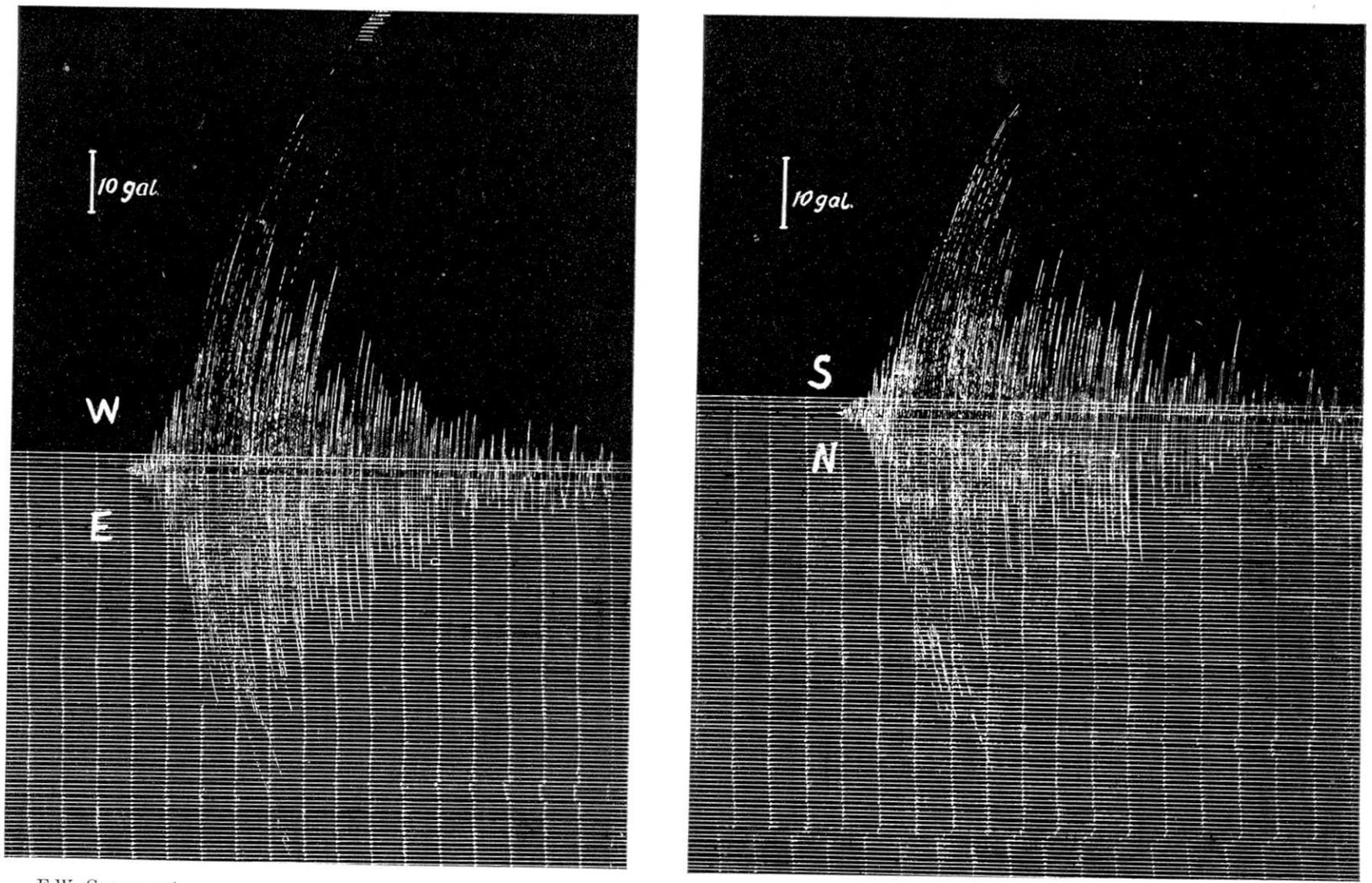


E.W. Component.



N.S. Component.

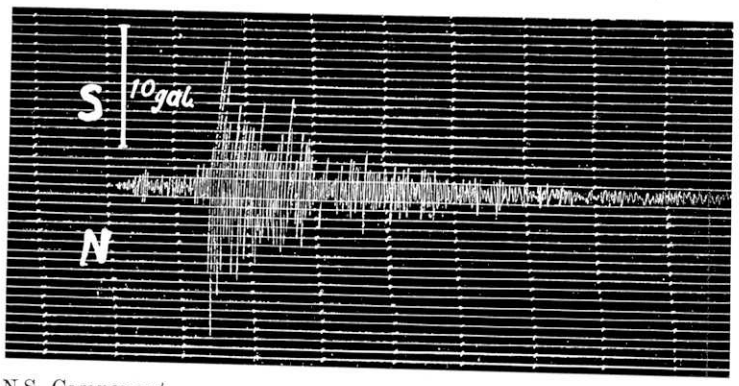
Fig. 10. Tôkyô Observation of the Earthquake of September 16, 1931.
Ishimoto Acceleration Seismograph Diagram.
(Time between consecutive two marks=6 sec.)



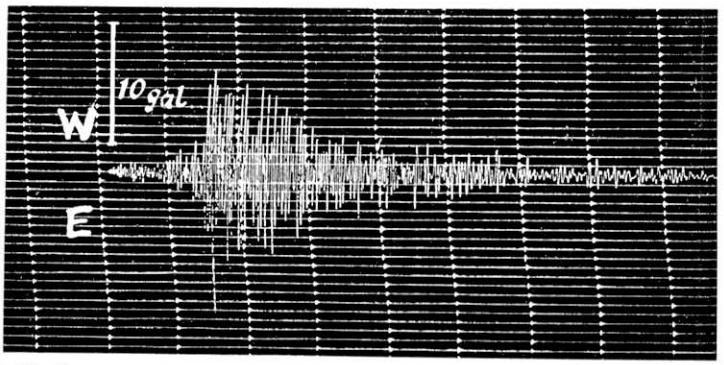
E.W. Component.

N.S. Component.

Fig. 12. Tôkyô Observation of the Strong Saitama Earthquake of September 21, 1931.
Ishimoto Acceleration Seismograph Diagrams.
(Time between consecutive two marks=6 sec.)

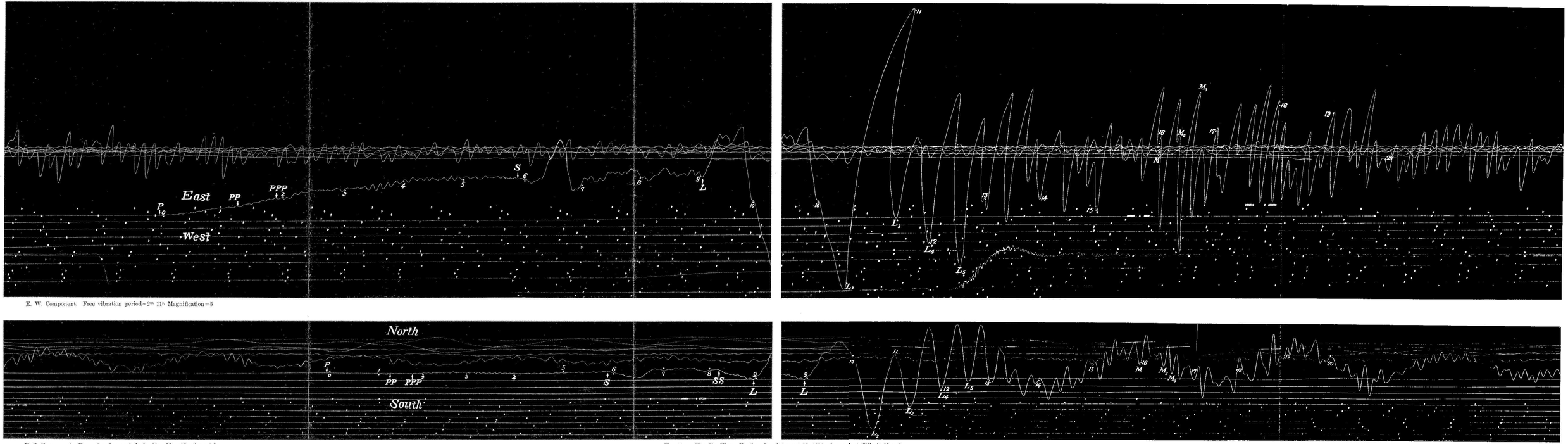


N.S. Component.



E.W. Component.

Fig. 13. Tôkyô Observation of the Earthquake of September 28, 1931.
Ishimoto Acceleration Seismograph Diagrams.
(Time between consecutive two marks=6 sec.)



E. W. Component. Free vibration period=2m 11s Magnification=5

N. S. Component. Free vibration period=3m 31s Magnification=1·5

Fig. 14. The Sin Kiang Earthquake of August 10, 1931, observed at (Tōkyō) Hongō.
Imamura Long Period Horizontal Pendulum Seismograph Record
Time of commencement=21h 26m 12s (G.M.T.)
(Minute mark is shown with dot.)