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ON
STRONG-MOTION RECORDS
No.5 (1970)

強震記録年次報告No.5 (1970)

STRONG-MOTION EARTHQUAKE RECORDS
FROM
PUBLIC WORKS IN JAPAN(1970)

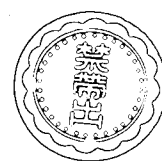
土木構造物における強震記録(1970)

MARCH 1972

昭和47年3月

THE PUBLIC WORKS RESEARCH INSTITUTE
MINISTRY OF CONSTRUCTION

建設省土木研究所



PUBLICATIONS ON STRONG-MOTION RECORDS

The Public Works Research Institute has published the following reports on strong-motion earthquake records reproduced in full size. In the reports there are three kinds of series, ANNUAL REPORT, SPECIAL REPORT, and SUMMARIZED REPORT.

(I) ANNUAL REPORT: These reports are series of general ones published annually and contain almost all strong-motion records obtained during the period indicated in the title of each report.

- No. 1 STRONG-MOTION EARTHQUAKE RECORDS FROM PUBLIC WORKS IN JAPAN (1961-1966), Technical Memorandum of P.W.R.I., No. 217, December, 1966.
- No. 2 STRONG-MOTION EARTHQUAKE RECORDS FROM PUBLIC WORKS IN JAPAN (1967), Technical Memorandum of P.W.R.I., No. 341, February, 1968.
- No. 3 STRONG-MOTION EARTHQUAKE RECORDS FROM PUBLIC WORKS IN JAPAN (1968), Technical Memorandum of P.W.R.I., No. 430, April, 1969.
- No. 4 STRONG-MOTION EARTHQUAKE RECORDS FROM PUBLIC WORKS IN JAPAN (1969), Technical Memorandum of P.W.R.I., No. 641, March, 1970.

(II) SPECIAL REPORT: These reports are series of special ones on specified earthquakes or quake swarms published immediately after each quake. Usually these records are also contained in ANNUAL REPORT, but sometimes they are not contained.

- No. 1 STRONG-MOTION EARTHQUAKE RECORDS FROM PUBLIC WORKS IN JAPAN (THE MATSUSHIRO QUAKE SWARM, DECEMBER 9, 1965-FEBRUARY 28, 1966, THE OCHIAI BRIDGE), Technical Memorandum of P.W.R.I., No. 163, April, 1966.
- No. 2 STRONG-MOTION EARTHQUAKE RECORDS FROM PUBLIC WORKS IN JAPAN (THE MATSUSHIRO QUAKE SWARM, MARCH 1 - JUNE 22, 1966, THE OCHIAI BRIDGE), Technical Memorandum of P.W.R.I., No. 194, July 1966.
- No. 3 STRONG-MOTION EARTHQUAKE RECORDS FROM PUBLIC WORKS IN JAPAN (THE MATSUSHIRO QUAKE SWARM, JUNE 25 - DECEMBER 1, 1966, THE OCHIAI BRIDGE), Technical Memorandum of P.W.R.I., No. 254, March, 1967.
- No. 4 STRONG-MOTION EARTHQUAKE RECORDS FROM PUBLIC WORKS IN JAPAN (THE MATSUSHIRO QUAKE SWARM, MAY 27 - OCTOBER 23, 1966, THE SUSOBANA DAM), Technical Memorandum of P.W.R.I., No. 263, March, 1967.
- No. 5 STRONG-MOTION EARTHQUAKE RECORDS FROM PUBLIC WORKS IN JAPAN (THE MATSUSHIRO QUAKE SWARM, OCTOBER 8, 1966 - FEBRUARY 2, 1967, THE CHIKUMAGAWA EMBANKMENT, Technical Memorandum of P.W.R.I., No. 236, March 1967.

(III) SUMMARIZED REPORT: These reports are series of summarized reports on especially major strong-motion records published occasionally (mostly every four years). These records are extracted from both ANNUAL REPORTS and SPECIAL REPORTS.

- No. 1 STRONG-MOTION EARTHQUAKE RECORDS FROM PUBLIC WORKS IN JAPAN (1961 - 1971), expected to be published in 1971.

REFERENCES

The following references are available for utilization and evaluation of the records

- 1) Earthquake Resistant Structure Section: "Digitized Data of Strong-Motion Earthquake Records (No. 1)", (in Japanese) Technical Memorandum of the Public Works Research Institute, No. 317, March, 1968.
- 2) Earthquake Resistant Structure Section: "Digitized Data of Strong-Motion Earthquake Records (No. 2)", (in Japanese) Technical Memorandum of the Public Works Research Institute, No. 318, 1968.
- 3) Structure Section: "Examination on the Characteristics of a SMAC-B2 Accelerograph and an Underground Seismograph", (in Japanese) Technical Memorandum of P.W.R.I., No. 399, March, 1968.
- 4) Eiichi Kuribayashi, Toshio Iwasaki. "Observed Earthquake Responses of Bridges", 4th WCEE, Chile, January, 1969.
- 5) Earthquake Resistant Structure Section: "Digitized Data of Strong-Motion Earthquake Records (No. 3)", (in Japanese) Technical Memorandum of the Public Works Research Institute, No. 461, May, 1969.

STRONG-MOTION EARTHQUAKE RECORDS
FROM
PUBLIC WORKS IN JAPAN(1970)

MARCH 1972

THE PUBLIC WORKS RESEARCH INSTITUTE
MINISTRY OF CONSTRUCTION

Abstract

This memorandum reports strong-motion earthquake records of ground motions and responses of engineering structures such as highway bridges, tunnels, dams, and embankments administrated by Ministry of Construction, Public Corporations, Hokkaido Development Bureau and Regional Governments.

The photographs of major record traces of strong earthquakes occurred in and around Japan in 1970 are reproduced in full size. Also the maximum amplitudes of all seismograph records are presented.

Preface

Strong-motion earthquake record is most helpful to establish reasonable design methods of structures subjected to earthquake motions.

In 1960 the Public Works Research Institute proposed a recommendation to the Ministry of Construction on project of survey of ground motions and structural responses during strong-motion earthquakes. In response to the recommendation the Ministry gave the approval. Since then the project has obliged it to install instruments, to consult the way of installing and instrumentation, and to analyze and publish the records obtained.

Total number of SMAC type accelerographs (three component accelerometer) operated is one hundred and fifty two and total number of the accelerometers is four hundred and fifty six. Meanshile, total number of electro-magnetic type accelerometers is two hundred.

Several reports reproducing record traces in full size have already published as shown inside front cover of this report. And some analyses have been done and these typical reports are shown in References.

The present report reproduces strong-motion seismograph records obtained from public works in Japan--such as highway bridges, tunnels, dams, and embankments--and on grounds near the structures during the year of 1970, and summarizes their maximum acceleration values.

The structures which served strong-motion seismographs are administrated by Ministry of Construction, Public Corporations, Hokkaido Development Bureau and Regional Governments.

March 1972

compiled by

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Acknowledgements

The present network of strong-motion instrumentation on public works in Japan is due to efforts of the staff of the Public Works Research Institute that have installed the instruments and serviced instrumentation since 1960. The purchase of the instruments has been a cooperative effort of the Regional Construction Bureaus of the Ministry of Construction, Regional Governments throughout Japan, Public Corporations (such as Japan Highway, Tokyo Expressway, Hanshin Expressway, and Water Resources Development), and Hokkaido Development Bureau under the general direction of the Public Works Research Institute.

We should mention the skill and care which has been put into the design and fabrication of the instruments by the members of SMEOC (Strong-Motion Earthquake Observation Committee established in 1951 in Japan) and the manufacturing companies.

The members dealing with field work made notable contributions to the success of the surveys.

Table 1. Strong-Motion Seismograph Stations for SMAC-Type Accelerographs,
Including Stations Expected in Future

as of March, 1971

Station Number	Station (Name of Structure)	Number of Instruments	Seismograph Type	Location	Year & Month Installed
101	Shinkatsushika Bridge	2 (Ground 1, Pier 1)	SMAC-B2	Matsudo-City, Chiba-Pref.	1966-3
102	Yoneyama Ōhashi "	3 (Ground 1, Pier 2)	" "	Kashiwazaki-City, Niigata-Pref.	66-2, 66-5
103	Ajigawa Ōhashi "	3 (" ")	" "	Benten-Chō, Minato-Ku, Ōsaka	1963-3
104	Shintonegawa "	2 (Ground 1, Pier 1)	SMAC-B2	Kurihashi-Chō, Saitama-Pref.	1967-2
105	Masaki Ōhashi "	2 (" ")	SMAC-E2	Otobe, Taro-Cho, Shimohei-Gun, Iwate-Pref.	1971-2
106	Soka "	2 (Ground 1, Pier 1)	SMAC-B2	Soka-City, Saitama-Pref.	1968-3
107	Ōiso "				*
108	Himekawa "				*
109	Kisogawa "				*
110	Hijiyama "				*
111	Mimitsu "				*
112	Kinokawa "	2 (Ground 1, Pier 1)	SMAC-B2	Wakayama-City, Wakayama-Pref.	1967-3
113	Heiwa "	2 (" ")	SMAC-B2, D	Waga-Gun, Waga-Chō, Iwate-Pref.	69-3, 70-3
114	Amagasaki "	2 (" ")	SMAC-B2, C2	Amagasaki-City, Hyōgo-Pref.	1963-3
115	Sakuragawa "				*
201	Oya "	2 (Ground 1, Pier 1)	SMAC-B2	Aizuwakamatsu-City, Fukushima-Pref.	1965-3
202	Uonuma "	2 (" ")	" "	Ojiya-City, Niigata-Pref.	1965-12
203	Yokokurasawa "	2 (" ")	" "	Yokokura, Sakae-Mura, Nagano-Pref.	1965-10
204	Shinyawata "	2 (" ")	" "	Chita-Chō, Aichi-Pref.	1965-11
205	Ishiseto "	2 (" ")	" "	Nojiri-Chō, Miyazaki-Pref.	1965-3
206	Omigawa Ōhashi "				*
207	Takatsu "	2 (Ground 1, Pier 1)	SMAC-B2	Masuda-City, Shimane-Pref.	1967-3
208	Turusaki "				*
301	Yūhei "	2 (Ground 1, Pier 1)	SMAC-B2	Jumonji-Chō, Akita-Pref.	1966-12
302	Kaihoku "	2 (" ")	" "	Ishinomaki-City, Miyagi-Pref.	1966-3
303	Kahoku "	2 (" ")	" "	Sagae-City, Yamagata-Pref.	1965-3
304	Date "	2 (" ")	" "	Date-Chō, Fukushima-Pref.	1965-10
305	Minato Ōhashi "	2 (" ")	" "	Tsuiyama, Toyooka-City, Hyōgo-Pref.	1965-3
306	Myōken "	2 (" ")	" "	Nishisono-Chō, Izumo-City, Shimane-Pref.	66-3, 67-3
307	Godaisan "	2 (" ")	" "	Godaisan, Kōchi-City, Kōchi-Pref.	1966-3

Table 1. (Continued)

Station Number	Station (Name of Structure)	Number of Instruments	Seismograph Type	Location	Year & Month Installed
308	Itajima Bridge	2 (Ground 1, Pier 1)	SMAC-B2	Uwajima-City, Ehime-Pref.	1966-3
309	Otome "	2 (" ")	" "	Otome, Mifune-Chō, Kumamoto-Pref.	1965-3
310	Hirai "	3 (Ground 1, Pier 2)	" "	Hirai, Edogawa-Ku, Tōkyō	1965-8
311	Toyohama "	2 (Ground 1, Pier 1)	" "	Ise-City, Mie-Pref.	1966-9
312	Akagi "	2 (" ")	" "	Higashikumanogawa-Chō, Wakayama-Pref.	1966-9
313	Ishizuchi "	2 (" ")	" "	Ishizuchi, Komatsu-Chō, Ehime-Pref.	1967-3
314	Kiyokawa "	2 (" ")	" "	Kiyokawa, Tachikawa-Chō, Yamagata-Pref.	68-10, 69-3
315	Shinpō "				*
316	Tsugaru Ōhashi "	2 (Ground 1, Pier 1)	SMAC-D	Nakazato-Chō, Aomori-Pref.	1970-3
317	Sezume "	2 (" ")	SMAC-B2	Yamakawa-Chō, Tokushima-Pref.	1967-3
318	Shinden "				*
319	Shitoku Ōhashi "	2 (" ")	SMAC-D	Shitoku, Nakagawa-Mura, Nagano-Pref.	1966-12
401	Biwako Ōhashi "	1 (Box girder)	SMAC-B2	Katada-Chō, Shiga-Pref.	1964-9
402					*
501	Tōkyō Bay (Futtu Cape)	1 (Ground)	SMAC-B2	Futtu-Cho, Chiba-Pref.	1965-10
502	Kanmon Bridge	2 (Ground 2)	" "	Yamaguchi-Pref. & Fukuoka-Pref.	1965-10
503	Tōkyō Bay (Kannonzaki)	1 (Ground)	" "	Yokosuka-City, Kanagawa-Pref.	1967-3
601	Muromaki Dam	1 (Dam)	SMAC-B2	Yatsuo-Chō, Nei-Gun, Toyama-Pref.	1961-8
602	Yokoyama "	2 (Rock 1, Dam 1)	" "	Fujihashi-Mura, Gifu-Pref.	1964-6
603	Sarutani "	1 (Ground)	SMAC-A	Ōtō-Mura, Yoshino-Gun, Nara-Pref.	1958-3
604	Amagase "	1 (Dam)	SMAC-B2	Ujikaneido, Uji-City, Kyōto-Pref.	1964-8
605	Susobana "	2 (Rock 1, Dam 1)	SMAC-B2, D	Konabe, Nagano-City, Nagano-Pref.	66-5, 69-12
606	Turuta "	2 (Ground 1, Dam 1)	SMAC-D	Tsuruta-Chō, Kagoshima-Pref.	1968-12
607	Kanayama "				*
608	Shijushida "				*
609					*
610	Koshibu "	2 (Rock 1, Dam 1)	SMAC-D	Nakagawa-Mura, Nagano-Pref.	1968-12
611	Saigawa "				*
612	Kimigano "				*
613	Shimouke "				*

Table 1. (Continued)

Station Number	Station (Name of Structure)	Number of Instruments	Seismograph Type	Location	Year & Month Installed
614	Yahagi Dam				*
701	Yodogawa Embankment	2 (Ground 1, Emb. 1)	SMAC-B2	Shin-Machi, Hirakata-City, Ōsaka-Pref.	1966-3
702	Tōkyō "				*
703	Sekiya Diversion Weir				*
704	Okayama Embankment				*
705					*
801	Ariake Sea Embankment	1 (Ground)	SMAC-B2	Daijugarami, Higashiyoka-Chō, Saga-Pref.	1965-8
802	Aomori				*
803	Toyama				*
804	Kanazawa				*
805	Okayama				*
806					*
901	P.W.R.I., Chiba Branch	1 (Ground)	SMAC-B2	Anagawa, Chiba-City, Chiba-Pref.	62-3 (67-3)
902	Nishiarai Bridge	3 (Ground 1, Pier 2)	" "	Nishiarai-Chō, Adachi-Ku, Tōkyō	1962-3
903	Shōwa Ōhashi "	2 (" Pier 1)	" "	Niigata-City, Niigata-Pref.	1965-1
904	Shintenryugawa "	2 (" ")	" "	Toyoda-Mura, Iwate-Gun, Shizuoka-Pref.	1964-12
905	Ochiai "	3 (Ground 2, ")	" "	Nagano-City, Nagano-Pref.	1965-12
906	P.W.R.I., Kashima	1 (Ground)	" "	Kashima-Gun, Ibaragi-Pref.	1967-3
907	Taira Bridge	2 (Ground 1, Pier 1)	" "	Taira, Iwaki-City, Fukushima-Pref.	1968-1
908	Honjō "				*
909	Miyako				*
910	Hachinohe				*
911	Takamatsu				*
912	Miyazaki				*
1001	Ajigawa				
1002	Fujikawa Bridge	2 (Ground 1, Pier 1)	SMAC-B2	Fuji-City, Shizuoka-Pref.	1967-3
1003	Hamanako "	2 (" ")	SMAC-D	Inase-Gun, Shizuoka-Pref.	68-12, 69-3
1004	Sakaigawa "	2 (" ")	SMAC-B2	Uenohara-Chō, Yamanashi-Pref.	1967-3
1005	Ubakubo "	2 (" ")	" "	Ubakubo, Hino-City, Tōkyō	1967-3
1006	Tsurukawa "	2 (" ")	" "	Uenohara-Chō, Yamanashi-Pref.	1967-3

Table 1. (Continued)

Station Number	Station (Name of Structure)	Number of Instruments	Seismograph Type	Location	Year & Month Installed
1007	Toyokawa Bridge	2 (Ground 1, Pier 1)	SMAC-B2	Ichinomiya-Chō, Hoi-Gun, Aichi-Pref.	1968-3
1008	Kisogawa "				*
1009	Sakawagawa "	2 (Ground 1, Pier 1)	SMAC-D	Ashigarakami-Gun, Kanagawa-Pref.	1969-3
1101	Iwamoto-Chō (Route 1)				*
1102	Shibakaigandori (")				*
1103	Morigasaki-Chō (")				*
1104	Aoyamatakagi-Chō (Route 3)				*
1105	Ikebukuro (Route 5)				*
1106	Tsutsumidōri (Route 6)				*
1107	Ōshima-Chō (Route 7)				*
1108	Ichinohashi Bridge	2 (Ground 1, Pier 1)	SMAC-B2	Azabu, Minato-Ku, Tōkyō	1967-7
1109	Haneda Undersea Tunnel	3 (Ground 1, Tunnel 2)	" "	Ōmoriminami-Chō, Ōta-Ku, Tōkyō	1968-2
1201	Nishiyokobori Bridge	2 (Ground 1, Pier 1)	SMAC-B2	Minamisumiya-Machi, Minami-Ku, Osaka	1965-3
1202	Ikue-Chō, Asahi-Ku				*
1203	Minamitsumori Bridge	2 (Ground 1, Pier 1)	SMAC-D	Tsumori-Chō, Nishinari-Ku, Ōsaka	1970-3
1301	Civil Engineering Research Institute				moved
1302	Chiyoda Bridge	3 (Ground 1, Pier 2)	SMAC-B2	Makubetsu-Chō, Nakagawa-Gun, Tokachi	1966-11
1303	Shin-ishikari "	2 (Ground 1, Pier 1)	" "	Tsuishikari, Ebetsu-City, Ishikari	67-8, 68-11
1304	Otanoshike "	2 (" ")	" "	Otanoshike, Kushiro-City, Kushiro	1967-10
1305	Horoman "	2 (" ")	" "	Horoman, Samani-Chō, Samani-Gun, Hidaka	1967-12
1306	Asahikawa "	2 (" ")	" "	Kamui-Chō, Asahikawa-City, Kamikawa	68-11, 69-3
1307	Shichihō "	2 (" ")	" "	Yunosato, Shiriuchi-Chō, Kamiiso-Gun, Oshima	1968-11
1308	Ishikarikakō "	3 (Ground 1, Pier 2)	" "	Yausuba, Ishikari-Chō, Ishikari-Gun, Ishikari	1970-3
1309	Muine "	2 (Ground 1, Pier 1)	SMAC-D	Jōzankei, Sapporo-City, Ishikari	1969-10
1310	Syari "	1 (Ground)	" "	Toyokura, Syari-Chō, Syari-Gun, Abashiri	1970-1
1401	Tonegawa Estuary Dam	2 (Ground 1, Dam 1)	SMAC-D	Omigawa-Chō, Katori-Gun, Chiba-Pref.	1969-3
1501	Iwaya	1 (Ground)	SMAC-B	Iwaya, Awaji-Cho, Tsuna-Gun, Hyogo-Pref.	1962-10
1502	Akashi	1 (1st Floor)	SMAC-B2	Hitomaru-Cho, Akashi-City, Hyogo-Pref.	"
1503	Shioya	1 (Ground)	SMAC-B	Shioya-Cho, Tarumi-Ku, Kobe-City, Hyogo-Pref.	"

Table 1. (Continued)

Station Number	Station (Name of Structure)	Number of Instruments	Seismograph Type	Location	Year & Month Installed
1504	Naruto	1 (Ground)	SMAC-B	Tosadomariura, Naruto-Cho, Naruto-City, Tokushima	1963-3
1505	Naoshima	1 (")	"	Naoshima-Cho, Kagawa-Gun, Kagawa-Pref.	"
1506	Takamatsu	1 (")	"	Hamano-Cho, Takamatsu-City, Kagawa-Pref.	"

Table 4. Number of Strong-Motion Seismograph Stations

and that of Instruments in Relation to the Variety of Structures

Operated as of March, 1971

Variety of Structure		Number of Stations		Number of Instruments		
		SMAC	Electro-Magnetic-type Seismograph	Number of SMAC		Number of Components of Electro-Magnetic-type Seismograph
				Ground	Structure	
Bridge		59	6	60	63	57
Tunnel		1	-	1	2	-
Dam	Concrete	7	11	5	6	104
	Fill-type	-	2	-	-	15
Embankment	River	2	3	1	3	25
	Coast	-	-	-	-	-
Future Structure Site		9	4	9	-	33
Others		2	1	2	-	9
Total		80	27	78	74	243

別表 所有者別・会計別にみた強震計台数

所有者	会計	一般会計	道特路会	海岸特会	治水特会	都 県	公 団	北海道開発局	合 計
地方建設局	-	-	24	1	11	-	-	-	36
土木研究所	8	6	-	-	-	-	-	-	14
都 県	-	-	-	-	-	50	-	-	50
5公団	-	-	-	-	-	-	31	-	31
北海道開発局	-	-	-	-	-	-	-	21	21
合 計	8	30	1	11	50	31	21	152	

Table 2. Strong-Motion Seismograph Stations with Electro-Magnetic Type Seismographs

as of March, 1971

Station Number	Station (Name of Structure)	Number of Components	Location	Year Installed
01	Yuda Dam	6, (Accelerometer)	Waga-Chō, Waga-Gun, Iwate-Pref.	1965
02	Minase "	6, (")	Minase-Mura, Okachi-Gun, Akita-Pref.	1963
03	Narugo "	8, (Displacementmerter)	Narugo-Chō, Tamazukuri-Gun, Miyagi-Pref.	1957
04	Kawamata "	10, (Accelerometer)	Kuriyama-Mura, Shioya-Gun, Tochigi-Pref.	1964
05	Muromaki "	12, (9 Acc. and 3 Disp.)	Yatsuo-Chō, Nei-Gun, Toyama-Pref.	1961
06	Sasaogawa "	10, (4 Acc. and 6 Disp.)	Nishitani-Mura, Ōno-Gun, Fukui-Pref.	1966
07	Yokoyama "	12, (7 Acc. and 5 Disp.)	Fujihashi-Mura, Ibi-Gun, Gifu-Pref.	1962
08	Amagase "	12, (Accelerometer)	Ujikaneido, Uji-City, Kyoto-Pref.	1964
09	Sarutani "	5, (2 Acc. and 3 Disp.)	Ōtō-Mura, Yoshino-Gun, Nara-Pref.	1957
10	~~Ayakita "~~	~~6, (Accelerometer)~~	~~Suki-Mura, Nishimorokata-Gun, Miyazaki-Pref.~~	1961 Δ
11	Shinkatsushika Bridge	6, (3 Acc. and 3 Earth-pressure)	Matsudo-City, Chiba-Pref.	1967
12	Suruga "	6, (Accelerometer)	Minamiabe, Shizuoka-City, Shizuoka-Pref.	1959
13	~~Yoshida "~~	~~6, (")~~	~~Toyohashi-City, Aichi-Pref.~~	1959 Δ
14	~~Honshu-shikoku (Tarumi)~~	~~3, (")~~	~~Tarumi-Ku, Kobe-City, Hyogo-Pref.~~	1962 Δ
15	~~" " (Shamijima)~~	~~3, (")~~	~~Sakaide-City, Kagawa-Pref.~~	1962 Δ
16	Biwako Ohashi Bridge	6, (2 Acc. and 4 Disp.)	Katada-Chō, Shiga-Pref.	1963
17	Wakato "	18, (Accelerometer)	Wakamatsu-Ku, Kitakyushu-City, Fukuoka-Pref.	1961
18	Ariake-Sea Embankment (Ōyano Jima)	3, (")	Ōyanō-Cho, Amakusa-Gun, Kumamoto-Pref.	1963
19	Toyokawa "	8, (4 Acc. and 4 Disp.)	Toyohashi-City, Aichi-Pref.	1966
20	Tonegawa "	9, (6 Acc. and 3 Disp.)	Kurihashi-Chō, Saitama-Pref.	1968
21	Ōtagawa "	8, (4 Acc. and 4 Disp.)	Hiroshima-City, Hiroshima-Pref.	1965
22	Nagano (Under ground)	9, (Accelerometer)	Nagano-City, Nagano-Pref.	1966
23	~~Hirai Bridge~~	~~8, (5 Acc. and 3 Earth-pressure)~~	~~Hirai, Edogawa-Ku, Tokyo~~	1967 Δ
24	Shijushida Dam	9, (Accelerometer)	Shimokuriyagawa, Morioka-City, Iwate-Pref.	1967
25	Onomichi Bridge	11, (")	Mukaihigashi-Chō, Mitsugi-Gun, Hiroshima-Pref.	1968
26	Saigawa Dam	10, (")	Futamatahin-Machi, Kanazawa-City, Ishikawa-Pref.	1968
27	Yahagi "	13, (")	Asahi-Mura, Higashikamo-Gun, Aichi-Pref.	1970-3
28	Futtu Cape (Under ground)	9, (")	Futtu-Chō, Kimitsu-Gun, Chiba-Pref.	1970-2
29	Ukishima Park (")	12, (")	Ukishima-Chō, Kawasaki-City, Kanagawa-Pref.	1970-3
30	Kamafusa Dam	6, (")	Kawasaki-Chō, Shibata-Gun, Miyagi-Pref.	1970-3
31	Akkeshi Ohashi Bridge	10, (")	Akkeshi-Chō, Akkeshi-Gun, Kushiro	1971-3
32	Kannonzaki (Under ground)	9, (")	Hashirimizu, Yokosuka-City, Kanagawa-Pref.	1971-3

Note: Stations with delata-mark are out of operation.

Table 3. Number of Strong-Motion Seismograph Stations
and that of Instruments in Relation to the Groups Defined by Sponsorship

Operated as of March, 1971

Group (Administrative Sponsor)		Type	Strong-Motion Accelerograph, SMAC										Electro-Magnetic Type Seismograph	
		Period	Number of Station	Number of Instruments								Number of Station	Number of Instruments	
				before 1963	1964	1965	1966	1967	1968	1969	1970			Total
I	First National Highway Section, Road Bureau (道路局国道 一課)	9	5	0	3	6	2	1	1	2	20	2	9A 3E	
II	Second National Highway Section, Road Bureau (道路局国道 二課)	6	0	4	6	2	0	0	0	0	12	0	0	
III	Local Road Section, Road Bureau (道路局地方道課)	17	0	6	12	13	0	2	2	0	35	1	10A	
IV	Toll Road Section, Road Bureau (道路局有料道路課)	1	0	1	0	0	0	0	0	0	1	1	2A 4D	
V	Planning Section, Road Bureau (道路局企画課)	3	0	0	3	1	0	0	0	0	4	3	30A	
VI	Development Section, River Bureau (河川局開発課)	7	4	1	0	1	0	4	1	0	11	13	94A 25D	
VII	River Improvement Section, River Bureau (河川局治水課)	1	0	0	2	0	0	0	0	0	2	2	8A 8D	
VIII	Seacoast Section, River Bureau (河川局海岸課)	1	0	0	1	0	0	0	0	0	1	1	3A	
IX	Public Works Research Institute (土木研究所)	7	4	4	2	2	2	0	0	0	14	2	15A 3D	
X	Japan Highway Public Corporation (日本道路公団)	7	0	0	0	8	2	4	0	0	14	2	29A	
XI	Tokyo Expressway Public Corporation (首都高速道路公団)	2	0	0	0	0	5	0	0	0	5	0	0	
XII	Hanshin Expressway Public Corporation (阪神高速道路公団)	2	0	2	0	0	0	0	2	0	4	0	0	
XIII	Hokkaido Development Bureau (北海道開発局)	10	1	0	0	3	4	5	6	2	21	0	0	
XIV	Water Resources Development Corporation (水資源開発公団)	1	0	0	0	0	0	2	0	0	2	0	0	
XV	Honshu-Shikoku Bridge Authority (本州四国連絡橋公団)	6	6	0	0	0	0	0	0	0	6	0	0	
Total			80	20	18	29	36	15	18	12	4	152	27	200A, 3E, 40D

Note 1) Each SMAC has three accelerometers (One Vertical and two Horizontal).

2) A, E and D in the extremely right column mean Accelerometers, Earth-pressure-meters and Displacement-meters, respectively.

Fig. 1 Sites of Strong-Motion Seismograph Stations for SMAC-Type Accelerographs - Observation Network of Ground Motions and Earthquake Responses of Highway Bridges, Tunnels, Dams, and Embankments -

as of March, 1970

Legend

- Station Operated as of March, 1970
- Station Expected in future

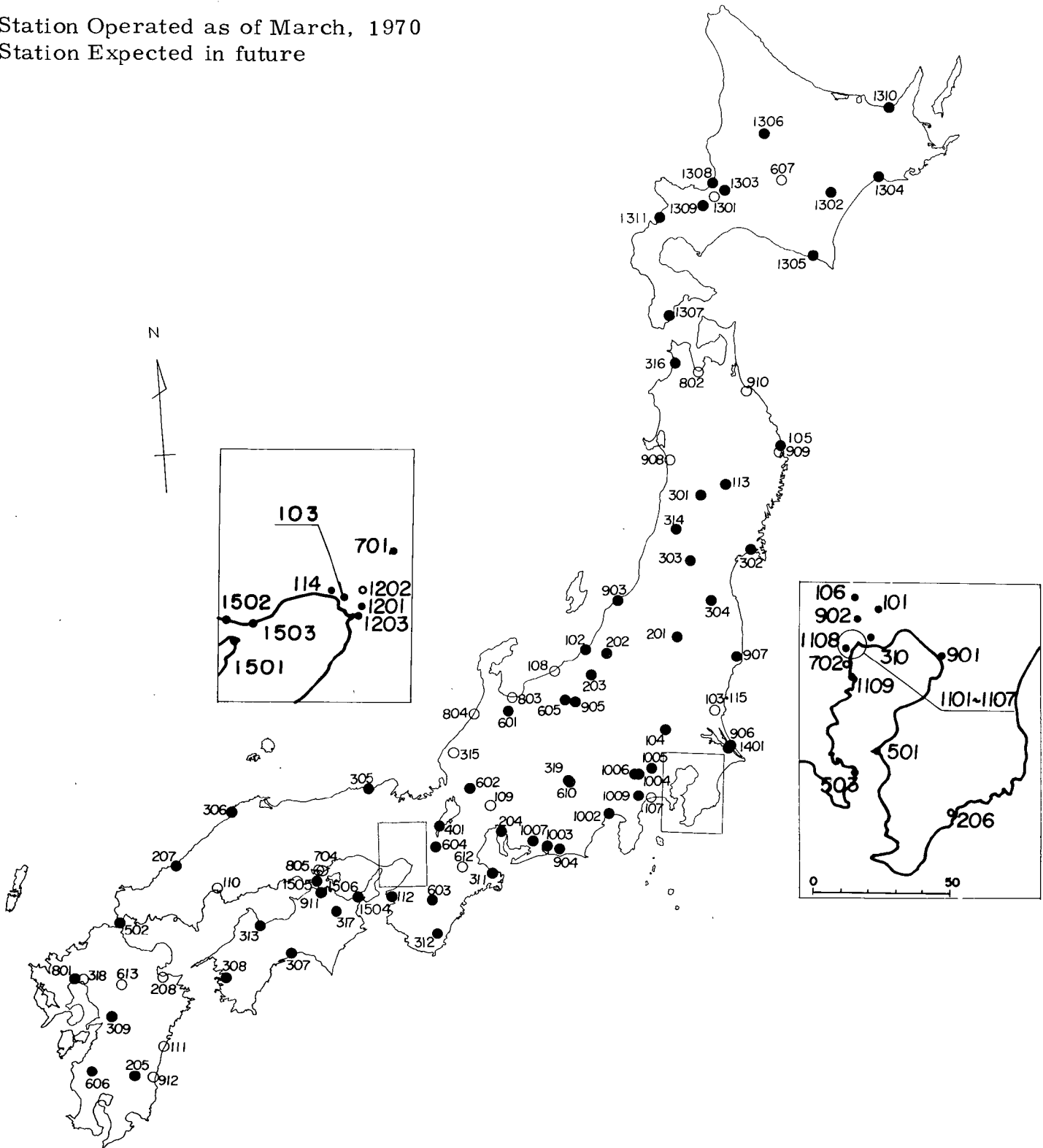


表 1 S M A C 型強震計配置計画一覧表

建設省土木研究所 (1971. 3. 31現在)

観測所名							型式	台数	設置箇所	県名	維持管理	設置年月	観測所名							型式	台数	設置箇所	県名	維持管理	設置年月
1. 国道一課													8. 海岸課												
101	新葛飾橋	SMAC-B2	2	地盤・橋脚	千葉	首都国道	41-3	804	有明海	SMAC-B2	1	地盤	佐賀	筑後川工事	40-8										
102	米山大橋	"	1	地盤・橋脚	新潟	長岡工事	41-3	802	青森	"	1	地盤	青森												
103	安治川大橋	"	3	地盤・橋脚	大阪	大阪国道工事	36-3	803	富山	"	1	地盤	富山												
104	新利根川橋	SMAC-B2	2	地盤・橋脚	埼玉	宇都宮国道	42-2	804	金沢松任	"	1	地盤	石川												
105	真崎大橋	" E2	2	"	岩手	三陸国道	46-2	805	岡山	"	1	地盤	岡山												
106	草加	SMAC-B2	2	地盤・橋脚	埼玉	宇都宮国道	43-3	806																	
107	大磯	"	2		神奈川			9. 土木研究所																	
108	姫川橋	"	2		新潟			901	土研千葉支所	SMAC-B2	1	地盤・橋脚	千葉	土研(千葉)	37-3										
109	木曾川橋	"	2		岐阜			902	西新井橋	"	3	地盤・橋脚	東京	"	37-3										
110	弘山橋	"	2		広島			903	昭和大橋	"	2	地盤・橋脚	新潟	"	40-1										
111	美々津橋	"	2		宮崎			904	新天竜川橋	"	2	"	静岡	岡	39-12										
112	紀ノ川大橋	SMAC-B2	2	地盤・橋脚	和歌山	和歌山工事	42-3	905	落合橋	"	3	地盤・橋脚	長野	野	40-12										
113	平和橋	" B2, D	2	"	岩手	岩手工事	41-3	906	研・鹿島試験所	"	1	地盤	茨城	鹿島試験所	42-3										
114	尼崎高架橋	" B2, C	2	"	兵庫	兵庫国道	38-3	907	平大橋	"	2	地盤・橋台	福島	土研(千葉)	43-1										
115	桜川橋	"	2		茨城			908	本庄大橋	"	2		秋田												
116								909	宮古市	"	2		岩手												
2. 国道二課								910	八戸市	"	2		青森												
201	小谷橋	SMAC-B2	2	地盤・橋脚	福島	若松土木	40-3	911	高松市	"	2		香川												
202	魚沼橋	"	2	"	新潟	小千谷土木	40-12	912	宮崎市	"	2		宮崎	川											
203	横倉沢橋	"	2	"	長野	飯山建設	40-10	913																	
204	新八幡橋	"	2	"	愛知	西知多道路	40-11	10. 日本道路会社																	
205	石瀬戸橋	"	2	"	宮崎	小林土木	40-3	1001	東名富士川橋	"	2	地盤・橋脚	静岡	静岡局	42-3										
206	小見川大橋	"	2		千葉			1002	東名浜名湖橋	SMAC-D	2	"	"	"	43-3										
207	高津大橋	SMAC-B2	2	地盤・橋脚	島根	益田土木	42-3	1003	境川橋	SMAC-B2	2	"	山梨	八王子局	42-3										
208	鶴崎橋	"	2		大分			1004	姥久保橋	"	2	"	東京	"	42-3										
209								1005	鶴川橋	"	2	"	山梨	"	42-3										
3. 地方道課								1006	東名豊川橋	"	2	"	愛知	名古屋局	43-3										
301	雄平橋	SMAC-B2	2	地盤・橋脚	秋田	平鹿土木	41-12	1007	東名豊川橋	"	2	"													
302	開北橋	"	2	"	宮城	石巻土木	41-3	1008																	
303	河北橋	"	2	"	山形	寒河江建設	40-3	1009	東名酒匂川橋	SMAC-D	2	地盤・橋脚	神奈川		44-3										
304	伊達橋	"	2	"	福島	保原土木	40-10	1010																	
305	港大橋	"	2	"	兵庫	豊岡土木	40-3	11. 首都高速道路会社																	
306	妙見橋	"	2	"	島根	出雲土木	41-3	1101	千代田区岩本町	"	2		1号線												
307	五台山橋	"	2	"	高知	高知土木	41-3	1102	港区芝海岸通	"	2		"												
308	板島橋	"	2	"	愛媛	宇和島土木	41-3	1103	太田区森ヶ崎町	"	2		"												
309	乙女橋	"	2	"	熊本	矢部土木	40-3	1104	港区青山高樹町	"	2		3号線												
310	平井大橋	"	3	地盤・橋脚	東京	第5建設	40-8	1105	豊島区池袋	"	2		5号線												
311	豊浜大橋	"	2	地盤・橋脚	三重	伊勢土木	41-9	1106	墨田区堤通り	"	2		6号線												
312	赤木橋	"	2	地盤・橋台	和歌山	新宮土木	41-9	1107	江東区大島町	"	2		7号線												
313	石鐘橋	"	2	"	愛媛	丹原土木	42-3	1108	一ノ橋高架橋	SMAC-B2	2	地盤・橋脚	2号線	工務部	42-7										
314	清川橋	"	2	"	山形	庄内支庁	43-10	1109	羽田海底トンネル	"	3	地盤・トンネル	1号線	"	43-2										
315	新保橋	"	2		福井			1110																	
316	津軽大橋	SMAC-D	2	地盤・橋脚	青森	五所川原土木	45-3	1111																	
317	瀬詰大橋	SMAC-B2	2	"	徳島	川島土木	42-3	12. 阪神高速道路会社																	
318	新田橋	"	2		福岡			1201	西横堀高架橋	SMAC-B2	2	地盤・橋脚	1号線	管理部保全課	40-5										
319	西田大橋	SMAC-B2	2	地盤・橋脚	長野	伊那建設	41-12	1202	地区生江町	"	2		3号線												
320								1203	南津守高架橋	SMAC-D	2	地盤・橋脚	4号線	管理部保全課	45-3										
4. 有料道路課								1204																	
401	琵琶湖大橋	SMAC-B2	1	橋脚	滋賀	大津土木	39-9	1205																	
402								13. 北海道開発局																	
403								1301	土木試験所	"	0		石狩	開発局	41-11										
5. 道路企画課								1302	千代田橋	SMAC-B2	3	地盤・基礎橋脚	十勝	"	41-11										
501	東京湾(富津)橋	SMAC-B2	1	地盤	千葉	東京湾岸道路	40-10	1303	新石狩大橋	"	2	地盤・橋脚	石狩	"	42-8										
502	関門架橋	"	2	地盤・橋脚	福岡	北九州国道	40-10	1304	大楽毛橋	"	2	"	釧路	"	42-10										
503	東京湾(観音橋)	"	1	地盤	神奈川	東京湾岸道路	42-3	1305	磯満橋	"	2	"	日高	"	42-12										
504								1306	旭川大橋	"	2	"	石狩	"	43-11										
6. 開発課								1307	七峠橋	"	2	"	渡島	"	43-12										
601	室牧ダム	SMAC-B2	1	堤体	富山	管理所(県)	36-8	1308	石狩河口橋	"	3	"	石狩	"	45-3										
602	横山ダム	"	2	地盤・堤体	岐阜	"(建)	37-7	1309	無意根大橋	SMAC-D	2	"	"	"	44-10										
603	猿谷ダム	SMAC-A	1	地盤	奈良	"(県)	33-3	1310	斜里大橋	"	1	地盤	網走	"	45-3										
604	天ヶ瀬ダム	SMAC-B2	1	堤体	京都	"(県)	39-8	1311	磯谷橋	"	2	地盤・橋脚	後志	"	45-11										
605	堀花ダム	" B2, D	2	地盤・堤体	長野	"(県)	41-12	1312																	
606	鶴田ダム	SMAC-D	2	"	鹿児島	"(建)	43-12	1313																	
607	金山ダム	"	1		北海道			1314																	
608								14. 水資源開発局																	
609								1401	利根川河口堰	SMAC-D	2	堰堤	2号	千葉	利根川河口堰事務所	44-3									
610	小波ダム	SMAC-D	2	地盤・堤体	長野	管理所(建)	43-12	1402																	
611								1403																	
612	君ヶ野ダム	"	1		三重			15. 本州四国連絡会社																	
613	下釜ダム	"	2		熊本			1501	岩屋	SMAC-B	1	地盤	兵庫	本四公団	37-10										
7. 治水課								1502	明石	" B2	"	1F	"	"	"	"									
701	淀川堤防	SMAC-B2	2	地盤・本体	大阪	淀川工事	41-3	1503	塩谷	" B	"	地盤	"	"	"	"									
702	東京高潮堰	"	1		東京			1504	鳴門	"	"	"	徳島	"	38-3										
703	関屋分水堰	"	2		新潟			1505	直島	"	"	"	香川	"	"										
704	岡山	"	1		岡山			1506	高松	"	"	1F	"	"	"										
705								1507																	

設置年月欄が空白の場所は未設置である。

Fig. 2 Sites of Strong-Motion Seismograph Stations for Electro-Magnetic Type Seismographs

- Observation Network of Ground Motions and Earthquake Responses of Highway Bridges, Dams, and Embankments -

as of March, 1970



表 - 2 電磁式強震計設置位置一覧表

昭和46年3月

番号	観測所名	成分数	維持管理	設置年
1	湯田ダム	6	東北地建湯田ダム管理所	1965
2	皆瀬ダム	6	秋田県皆瀬ダム管理事務所	1963
3	鳴子ダム	8	東北地建鳴子ダム管理所	1957
4	川俣ダム	10	関東地建川俣ダム管理所	1964
5	室牧ダム	12	富山県室牧ダム管理事務所	1961
6	笹生川ダム	10	福井県笹生川ダム管理事務所	1966
7	横山ダム	12	中部地建横山ダム管理所	1962
8	天ヶ瀬ダム	12	近畿地建天ヶ瀬ダム管理支所	1964
9	猿谷ダム	5	近畿地建猿谷ダム管理所	1957
10	△綾北ダム	6	宮崎県綾北ダム管理事務所	1961
11	新葛飾橋	6	関東地建首都国道工事事務所	1967
12	駿河大橋	6	中部地建静岡国道工事事務所	1959
13	△吉田大橋	6	中部地建名古屋国道工事事務所	1959
14	△本州四国(垂水)	3	土木研究所	1962
15	△" (砂弥島)	3	土木研究所	1962
16	琵琶湖大橋	6	滋賀県大津土木事務所	1963
17	若戸大橋	18	日本道路公団	1961
18	有明海締切堤(大矢野島)	3	九州地建熊本工事事務所	1963
19	豊川放水路堤防	8	中部地建豊橋工事事務所	1966
20	利根川堤防	9	土木研究所	1968
21	太田川堤防	8	中部地建太田川工事事務局	1965
22	長野(落合橋付近地中)	9	土木研究所	1966
23	△平井大橋	8	東京都第五建設事務所	1967
24	四十四田ダム	12	東北地建四十四田ダム管理所	1967
25	尾道大橋	11	日本道路公団	1968
26	犀川ダム	10	石川県犀川ダム管理事務所	1968
27	矢作ダム	13	中部地建矢作ダム管理所	1970
28	富津岬(地中)	9	関東地建東京湾岸調査事務所	1970
29	浮島公園(地中)	12	" "	1970
30	釜房ダム	6	東北地建釜房ダム管理所	1970
31	厚岸大橋	10	北海道庁	1971
32	観音崎(地中)	9	関東地建東京湾岸道路調査事務所	1971

△印の観測所は観測休止中

Table 5. Number of Records Obtained from Stations with Strong-Motion Accelerographs, SMAC in 1970

Station Number	Station	Number of Instruments		Total Number of Records			Number of Records Printed in this Report		
		Ground	Structure	Ground	Structure	Total	Ground	Structure	Total
102	Yoneyama Bridge	1	1	0	1	1	0	1	1
104	Shintonegawa "	1	1	4	0	4	2	0	2
106	Soka "	1	1	1	0	1	1	0	1
112	Kinokawa "	1	1	1	0	1	1	0	1
113	Wagagawa "	1	1	0	1	1	0	1	1
204	Shinyawata "	1	1	3	3	6	1	1	2
205	Ishiseto "	1	1	4	1	5	3	1	4
301	Yuhei "	1	1	5	4	9	4	4	8
302	Kaihoku "	1	1	2	2	4	2	2	4
303	Kahoku "	1	1	2	0	2	2	0	2
304	Date "	1	1	3	1	4	2	1	3
306	Myoken "	1	1	1	0	1	1	0	1
307	Godaisan "	1	1	0	2	2	0	0	0
308	Itajima "	1	1	3	0	3	3	0	3
309	Otome "	1	1	0	1	1	0	1	1
313	Ishizuchi "	1	1	2	3	5	1	2	3
501	Tokyo Bay (Futtu Cape)	1	0	5	-	5	1	-	1
502	Kanmon Bridge	1	0	1	-	1	0	-	0
901	P.W.R.I. Chiba Branch	1	0	3	-	3	2	-	2
902	Nishiarai Bridge	1	2	0	1	1	0	0	0
905	Ochiai "	2	1	2	3	5	1	1	2
906	P.W.R.I. Kashima E.L.	1	0	1	-	1	1	-	1
907	Taira Bridge	1	1	9	5	14	6	2	8
1302	Chiyoda "	1	2	1	2	3	1	2	3
1303	Ishikari "	1	1	1	1	2	1	1	2
1304	Otanoshike Bridge	1	1	1	0	1	1	0	1
1305	Horoman "	1	1	1	1	2	1	1	2
1307	Shichiho "	1	1	1	0	1	1	0	1
	Total	29	26	57	32	89	39	21	60

Note) Each instrument has 3 components: 1 vertical and 2 horizontal.

Table 6. In 1970 Earthquake Origins

Earthquake Number	Earthquake Time and Date				Location of Epicenter				Magnitude	Maximum Intensity	Record Number
	Year	Month	Day	Time	Epicentral Region	Longitude	Latitude	Depth			
70001	1970	1	8	08:58	Middle of Gifu Pref.	137°08'	35°45'	10	4.4	I: Nagoya, Tsu	204-Gr-7
70002	1970	1	9	03:37	Off Fukushima Pref.	141°16'	37°02'	40	4.5	II: Onahama	
70003	1970	1	14	20:34	E Coast of Chiba Pref.	140°26'	35°22'	00	3.8		901-Gr-43
70004	1970	1	21	02:33	S Part of Hokkaido	143°08'	42°23'	50	6.7	V: Hiroo, Obihiro	1302-Gr-10, 1302-P-8, 1302-A-8, 1303-Gr-5, 1303-P-1, 1304-Gr-4, 1305-Gr-11, 1305-P-5, 1307-Gr-1
70005	1970	1	29	15:03	N of Chiba Pref.	140°35'	35°53'	60	5.1	II: Tokyo, Chiba	104-Gr-15
70006	1970	2	10	19:40	SW Part of Ibaraki Pref.	140°06'	36°17'	60	3.1	III: Tokyo, Mito	104-Gr-16, 501-Gr-48, 901-Gr-44, 906-Gr-10
70007	1970	2	11	20:25	SW Part of Ibaraki Pref.	139°55'	36°03'	40	4.1	II: Utsunomiya	104-Gr-17, 106-Gr-18
70008	1970	2	15	13:01	Off Fukushima Pref.	141°28'	37°21'	50	5.1	III: Onahama, Fukushima	304-Gr-21, 907-Gr-39, 907-A-12
70009	1970	3	8	03:52	Off Fukushima Pref.	141°37'	37°04'	40	4.9	III: Onahama	907-Gr-40
70010	1970	4	1	23:23	Coast of Iwate Pref.	142°03'	39°45'	80		IV: Miyako, Morioka	301-Gr-6, 301-P-8
70011	1970	4	9	01:44	Near Matsushiro	138°06'	36°26'	00	5.0		905-A-424, 905-B-266, 905-C-119
70012	1970	4	9	04:42	Near Matsushiro	138°08'	36°27'	10			905-A-425
70013	1970	4	9	20:09	Near Matsushiro	138°06'	36°26'	00			905-A-426
70014	1970	5	21	17:09	South Gifu Pref.	136°31'	35°20'	10	4.8	III: Kyoto, Nagoya	204-Gr-8, 204-P-2
70015	1970	5	26	01:15	Off Fukushima Pref.	141°19'	37°01'	50	4.7	III: Onahama	907-Gr-41, 907-A-13
70016	1970	5	27	21:06	Bonin is	140°44'	27°22'	440		III: Tokyo, Tateyama	104-Gr-18, 304-Gr-22, 501-Gr-49, 902-P9-22, 907-Gr-42
70017	1970	7	10	06:04	SW Ibaraki Pref.	140°07'	36°05'	80		I: Kumagaya	907-Gr-43
70018	1970	7	11	23:28	Northern Ibaraki Pref.	140°35'	36°30'	50	5.1	III: Onahama, Utsunomiya	907-Gr-44
70019	1970	7	14	12:14	W Coast of Wakayama Pref.	135°05'	34°07'	0	3.5	III: Wakayama	112-Gr-22, 204-P-3
70020	1970	7	20	13:36	NF of Tokyo Bay	140°09'	35°57'	80		III: Chiba	501-Gr-50
70021	1970	7	26	07:41	Off Miyazaki Pref.	132°02'	32°04'	10	6.7	V: Miyazaki, Miyakonojo	205-Gr-8, 205-P-20, 309-P-18, 306-Gr-3, 308-Gr-11, 313-Gr-15, 313-P-6, 502-GrS-3

Table 6. (Continued)

Earthquake Number	Earthquake Time and Date				Location of Epicenter				Magnitude	Maximum Intensity	Record Number
	Year	Month	Day	Time	Epicentral Region	Longitude	Latitude	Depth			
70022	1970	7	26	07:59	Off Miyazaki Pref.	131°58'	32°04'	10	4.7	I: Miyazaki, Nobeoka	205-Gr-9, 308-Gr-12, 313-P-7
70023	1970	7	26	16:10	Off Miyazaki Pref.	13°06'	32°07'	10	6.1	IV: Miyazaki, Aburatsu	205-GR-10, 308-Gr-13, 313-Gr-6, 313-P-8
70024	1970	7	31	14:14	Near Onahama	140°58'	36°57'	10	3.4	I: Onahama	907-Gr-45
70025	1970	9	4	17:18	Central Gifu Pref.	137°08'	35°47'	10	4.6	I: Nagoya, Gifu	204-P-4, 204-Gr-9
70026	1970	9	14	18:45	Off Miyagi Pref.	142°20'	38°41'	40	6.2	IV: Miyako, Morioka	304-P-28, 304-Gr-23, 907-Gr-46, 501-Gr-51, 907-A-14, 302-GR-22, 302-P-27
70027	1970	9	21	14:08	Off Miyazaki Pref.	131°43'	31°15'	10	4.7	III: Aburatsu	205-Gr-11, 307-P-14
70028	9	29	19:11		Coast of Hiroshima Pref.	133°18'	34°26'	10	4.9	III: Fukuyama, Tadotsu	307-P-15
70029	1970	9	30	04:26	Eastern Kanagawa Pref.	139°38'	35°29'	40	4.8	III: Tokyo, Chiba	501-Gr-52
70030	10	4	09:25		F Coast of Chiba Pref.	140°24'	35°18'	20	4.2	II: Chiba	901-Gr-45
70031	1970	10	16	14:26	Southeastern Akita Pref.	140°45'	39°12'	0	6.2	V: Shizuishi, Yuda	301-P-9, 301-Gr-7, 303-Gr-14, 102-P-4, 113-P-1, 302-P-28, 302-Gr-23
70032	1970	10	16	14:34	Southeastern Akita Pref.	140°45'	39°15'	0	4.0		301-P-10, 303-Gr-15, 301-Gr-8
70033	1970	10	16	16:41	Southeastern Akita Pref.	140°50'	39°18'	10	3.6		301-Gr-9
7004	1970	10	16	18:10	Southeastern Akita Pref.	140°43'	39°15'	10	3.9		301-P-11, 301-Gr-10

Table 7. Strong-Motion Seismograph Results

Earthquake Number	Ground					Structure					A Remarks Column
	Page	Record Number	Max. Amplitude (gals)			Page	Record Number	Max. Amplitude (gals)			
			Hori. A	Vertical	Bori.B			Hori. A	Vertical	Hori. B	
102. Yoneyama Bridge											
70031						20	102-P-4	28.0	9.5	10.0	
104. Shintonegawa Bridge											
70005		104-Gr-15	3.1	3.1	*						
70006	21	104-Gr-16	7.5	3.1	7.5						
70007		104-Gr-17	4.4	1.9	2.5						
70016	22	104-Gr-18	11.3	2.5	3.8						
106. Soka Bridge											
70007	23	106-Gr-18	14.4	3.8	18.1						
112. Kinokawa Bridge											
70019	112-Gr-22		22.5	6.3	31.3						
113. Wagagawa Bridge											
70031						25	113-P-1	152.5	60.0	132.5	
204. Shinyawata Bridge											
70001	24	204-Gr-7	5.6	3.8	5.6						
70014		204-Gr-8	5.0	2.5	3.8		204-P-2	2.5	*	3.8	
70019							204-P-3	5.0	*	5.0	
70025		204-Gr-9	*	*	*	24	204-P-4	5.0	*	7.5	
205. Ishiseto Bridge											
70021	26	205-Gr-8	26.3	13.8	30.3	27	205-P-20	70.0	7.5	50.0	
70022		205-Gr-9	*	*	*						
70023	28	205-Gr-10	6.3	3.1	6.3						
70027	29	205-Gr-11	10.0	5.0	7.5						

Table 7. (Continued)

Earthquake Number	Ground					Structure					A Remarks Column
	Page	Record Number	Max. Amplitude (gals)			Page	Record Number	Max. Amplitude (glas)			
			Hori. A	Vertical	Hori. B			Hori. A	Vertical	Hori. B	
309. Otome Bridge											
70021						47	309-P-18	67.5	30.0	50.0	
313. Ishizuchi Bridge											
70021	47	313-Gr-5	7.5	*	6.3	48	313-P-6	23.8	1.9	5.0	
70022						50	313-P-7	18.8	3.1	7.5	
70023		313-Gr-6	*	*	*		313-P-8	5.0	*	4.4	
501. Tokyo Bay (Futtu Cape)											
70016		501-Gr-48	*	*	*						
70016		501-Gr-49	2.5	*	1.3						
70020		501-Gr-50	3.1	*	2.5						
70026		501-Gr-51	*	*	*						
70029	49	5010Gr-52	25.0	4.0	27.5						
502. Kanmon Bridge											
70021		502-Grs-3	*	*	8						
901. P.W.R.I., Chiba Branch											
70003		901-Gr-43	4.4	2.5	4.4						
70006	56	901-Gr-44	7.5	1.3	5.0						
70030	50	901-Gr-45	7.5	*	1.5						

Table 7. (Continued)

Earthquake Number	Ground					Structure					A Remarks Column
	Page	Record Number	Max. Amplitude (gals)			Page	Record Number	Max. Amplitude (glas)			
			Hori. A	Vertical	Hori. B			Hori. A	Vertical	Hori. B	
301. Yuhei Bridge											
70010	29	301-Gr-6	7.5	1.9	5.0	30	301-P-8	12.5	5.0	18.8	
70031	31	301-Gr-7	157.5	47.5	147.0	32	301-P-9	121.4	60.5	155.4	
70032	33	301-Gr-8	15.0	*	7.5	33	301-P-10	12.5	*	7.5	
70033		301-Gr-9	*	*	*						
70034	34	301-Gr-10	17.5	10.0	20.0	34	301-P-11	22.5	10.0	32.5	
302. Kaihoku Bridge											
70026	35	302-Gr-22	21.0	13.0	34.5	36	302-P-27	59.0	22.5	45.0	
70031	47	302-Gr-23	6.9	3.1	6.3	37	302-P-28	25.0	3.8	11.3	
303. Kahoku Bridge											
70031	38	303-Gr-14	7.5	2.5	10.0						
70032	39	303-Gr-15	7.5	2.5	9.5						
304. Data Bridge											
70008	40	304-Gr-21	21.3	6.3	12.5						
70016		304-Gr-22	3.8	*	1.9						
70026	41	304-Gr-23	34.0	6.0	17.5	42	304-P-28	20.0	6.0	31.0	
306. Myoken Bridge											
70021	43	306-Gr-3	20.0	2.5	15.0						
307. Godaisan Bridge											
70027							307-P-14	*	*	*	
70028							397-P-15	*	*	*	
308. Itajima Bridge											
70021	44	308-Gr-11	100.0	26.3	113.8						
70022	45	308-Gr-12	45.0	6.3	61.3						
70023	46	308-Gr-13	18.8	6.3	25.0						

Table 7. (Continued)

Earth-quake Number	Ground					Structure (Crest of Pier 7)					Structure (Crest of Pier 9)					A Remarks Column
	Page	Record Number	Max. Amp. (gals)			Page	Record Number	Max. Amp. (gals)			Page	Record Number	Max. Amp. (gals)			
			Hori. A	Vert.	Hori. B			Hori. A	Vert.	Hori. B			Hori. A	Vert.	Hori. B	
902. Nishiarai Bridge																
70016												902-Pg-22	5.0	*	5.0	
Earth-quake Number	Ground (Bridge Site)					Structure (Crest Pier)					Ground (Nagano City)					A Remarks Column
	Page	Record Number	Max. Amp. (gals)			Page	Record Number	Max. Amp. (gals)			Page	Record Number	Max. Amp. (gals)			
			Hori. A	Vert.	Hori. B			Hori. A	Vert.	Hori. B			Hori. A	Vert.	Hori. B	
905. Ochiai Bridge																
70011	51	905-B-266	57.5	7.4	26.3		905-A-424	6.3	*	1.9	52	905-C-119	8.1	7.5	8.1	
70012							805-A-425	8.8	*	3.1						
70013							905-A-426	7.5	*	1.9						
Earthquake Number	Ground					Structure					A Remarks Column					
	Page	Record Number	Max. Amplitude (gals)			Page	Record Number	Max. Amplitude (glas)								
			Hori. A	Vertical	Hori. B			Hori. A	Vertical	Hori. B						
906. P.W.R.I., Kashima Experiment Laboratory																
70006	53	906-Gr-10	6.3	*	6.3											
907. Taira Bridge																
70002		907-Gr-38	15.0	3.8	7.5		907-A-11	3.1	*	1.9						
70008	54	907-Gr-39	40.0	41.3	57.5	55	907-A-12	47.5	16.3	41.3						
70009	56	907-Gr-40	5.6	3.1	6.3											
70015	58	907-Gr-41	15.0	13.8	15.0		907-A-13	8.8	2.5	7.5						
70016	57	907-Gr-42	6.3	2.5	6.3											
70017		907-Gr-43	*	*	*											
70018		907-Gr-44	3.1	1.3	3.1											

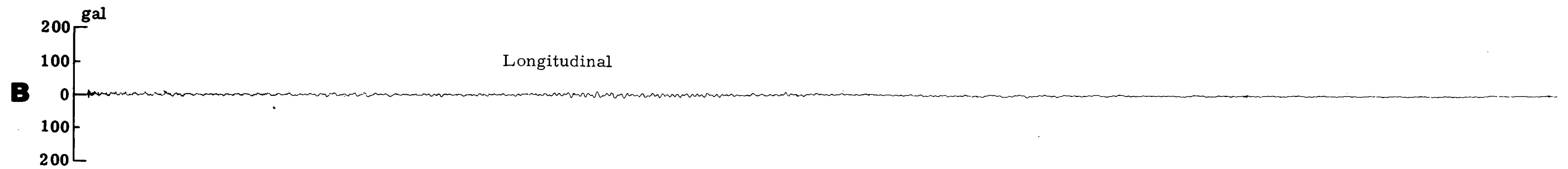
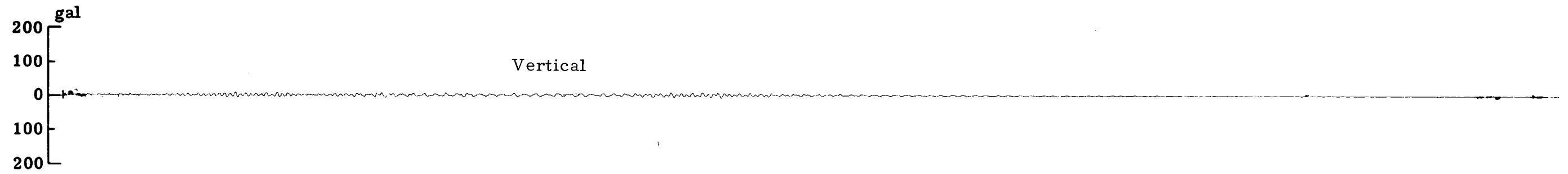
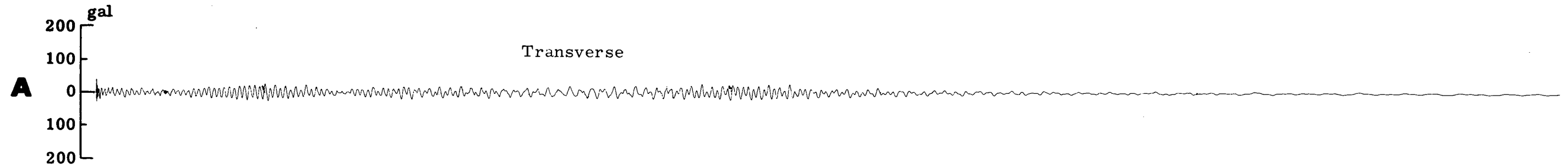
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Earthquake Number	Ground					Structure					A Remarks Column					
	Page	Record Number	Max. Amplitude (gals)			Page	Record Number	Max. Amplitude (glas)								
			Hori. A	Vertical	Hori. B			Hori. A	Vertical	Hori. B						
907. Taira Bridge																
70024	57	907-Gr-45	10.0	5.0	10.0											
70026	58	907-GR-46	18.0	5.5	16.0	59	907-A-14	12.5	5.0	7.5						
Earth- quake Number	Ground					Structure (Crest of Pier)					Structure (Crest of Abutment)					A Remarks Column
	Page	Record Number	Max. Amp. (gals)			Page	Record Number	Max. Amp. (gals)			Page	Record Number	Max. Amp. (gals)			
			Hoir. A	Vert.	Hori. B			Hori. A	Vert.	Hori. B			Hori. A	Vert.	Hori. B	
1302. Chiyoda Bridge		85.0	27.5	85.0	62, 63	1302-P-8	125.0	82.5	87.5	64, 65	1302-A-8	100.0	37.5	52.5		
70004	60, 61	1302-Gr-10														
Earthquake Number	Ground					Structure					A Remarks Column					
	Page	Record Number	Max. Amplitude (gals)			Page	Record Number	Max. Amplitude (glas)								
			Hori. A	Vertical	Hori. B			Hori. A	Vertical	Hori. B						
1303. Ishikari Bridge																
70004	66, 67	1303-Gr-5	65.0	20.5	57.5	68	1303-P-1	82.5	10.0	40.0						
1304. Otanoshike Bridge																
70004	69, 70	1304-Gr-4	*	7.5	22.5											
1305. Horoman Bridge																
70004	71	1305-Gr-11	105.0	45.0	147.5	72	1305-P-5	182.5	85.0	147.5						
1307. Shichiho Bridge																
70004	73	1307-Gr-1	12.5	*	5.0											

1sec

Yoneyama Bridge 102-P-4

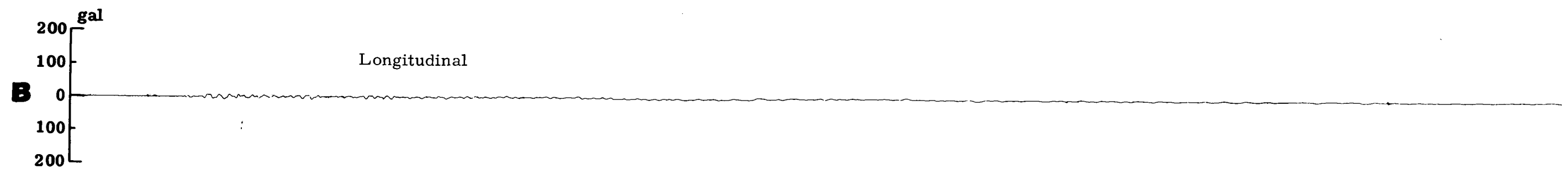
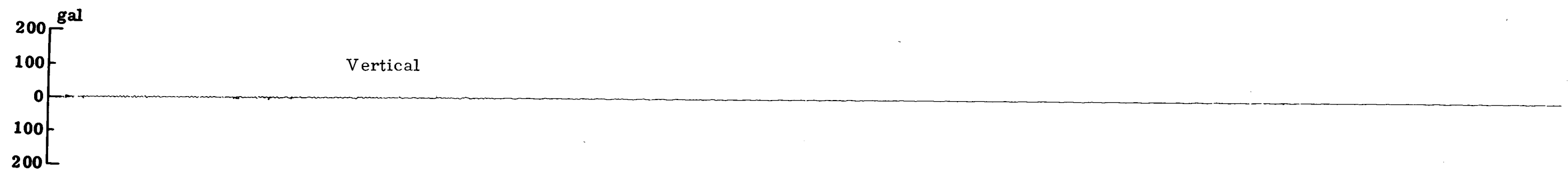
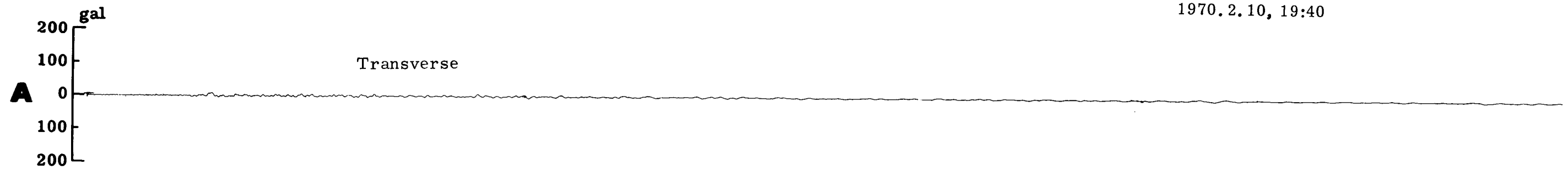
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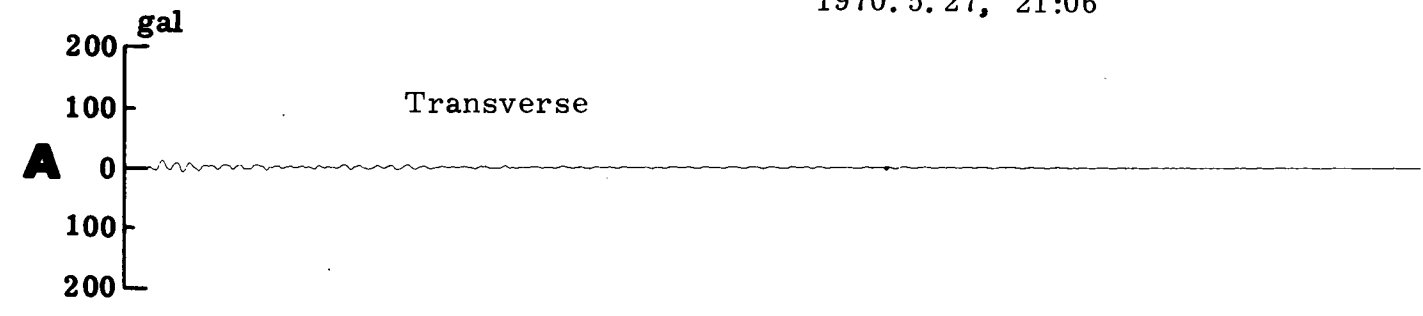
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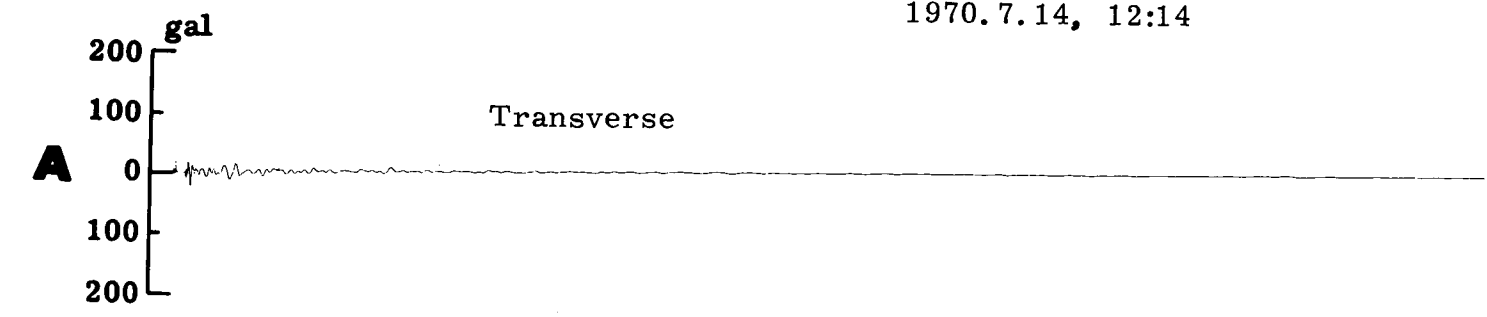
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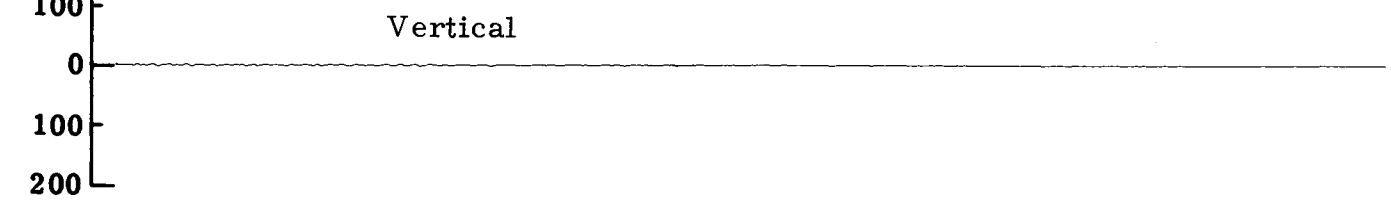


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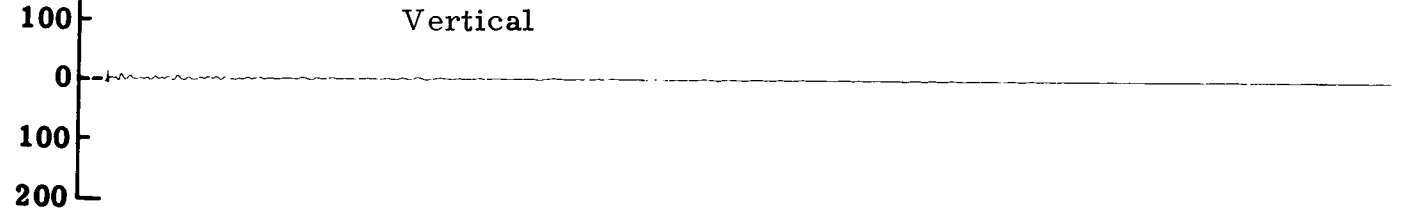
Kinokawa Bridge 112-Gr-22
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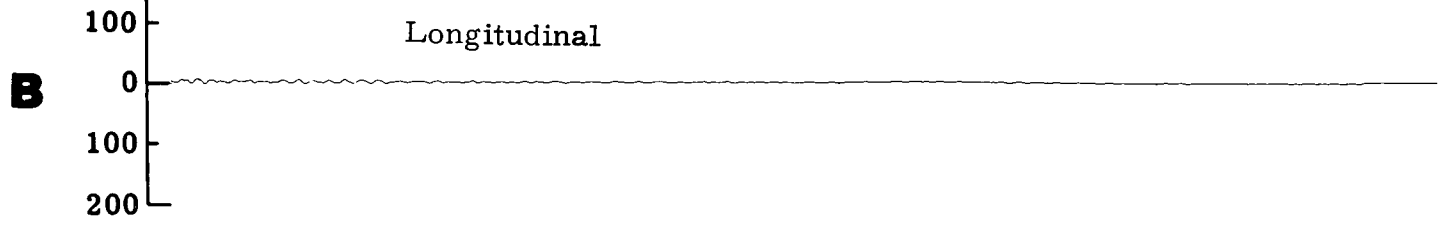
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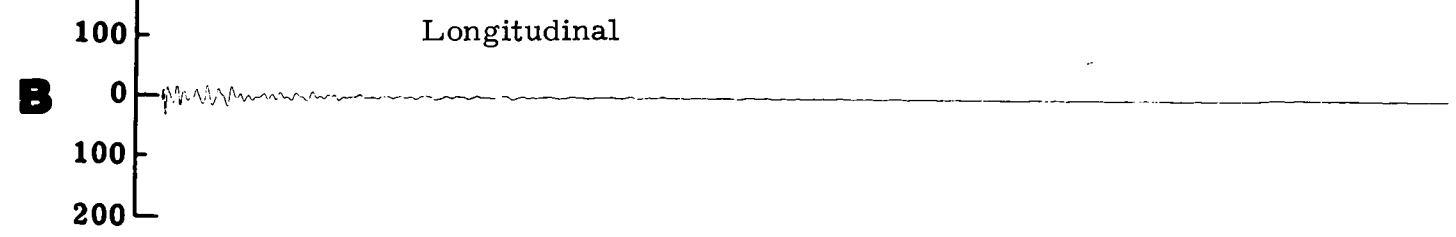
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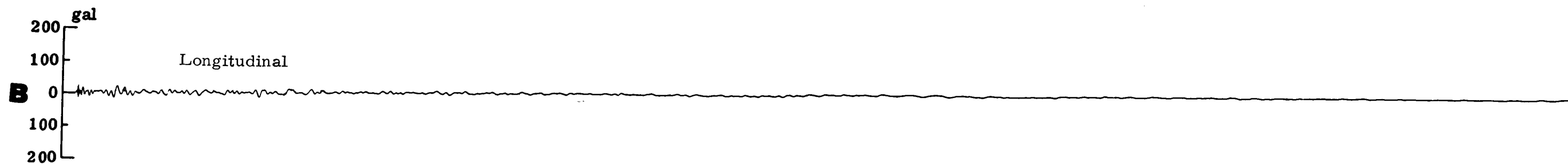
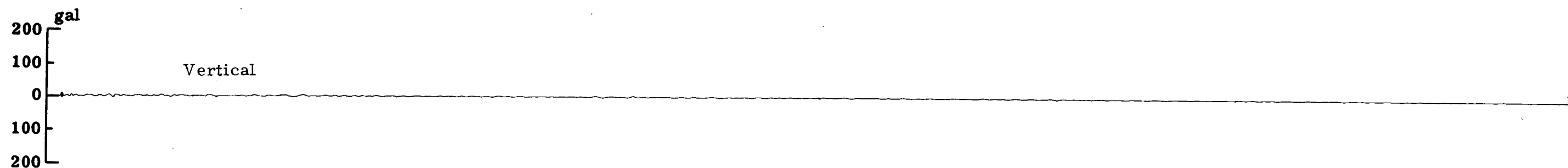
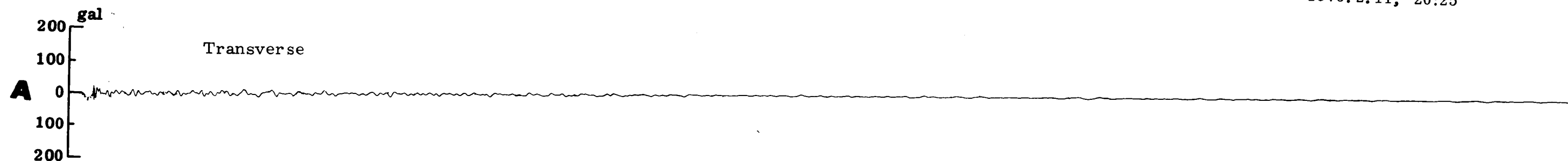


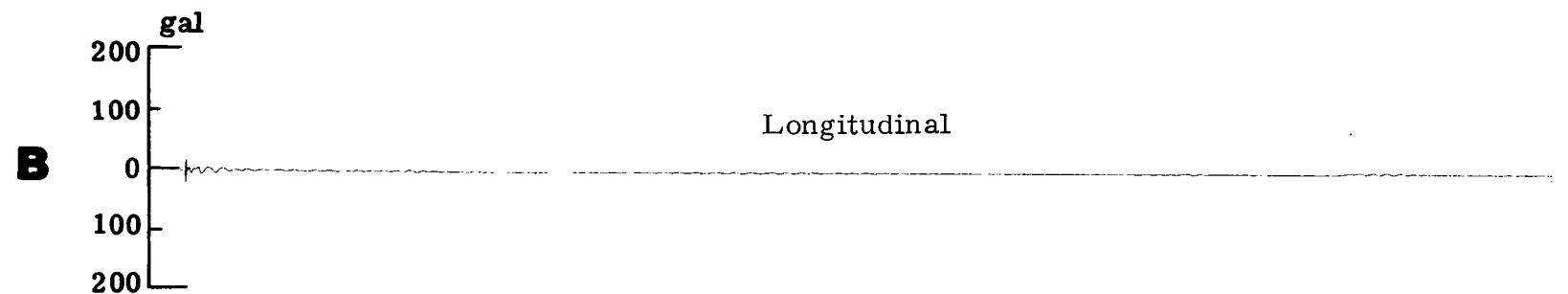
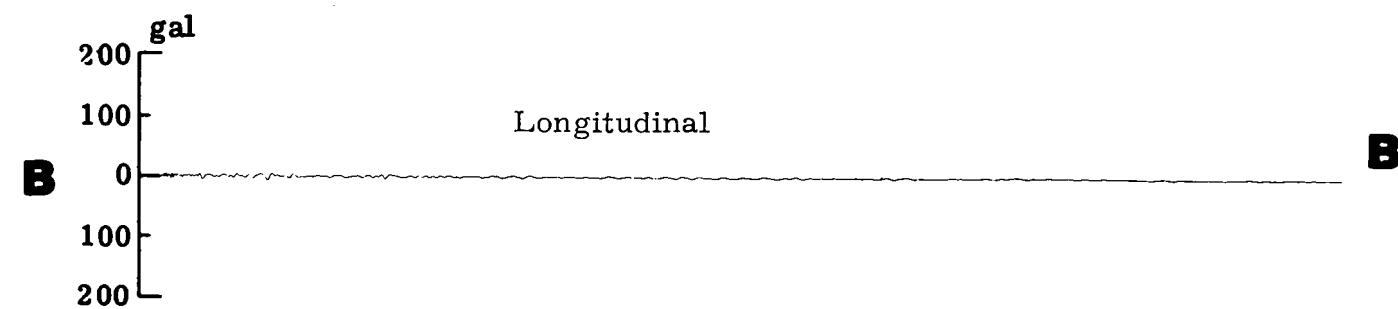
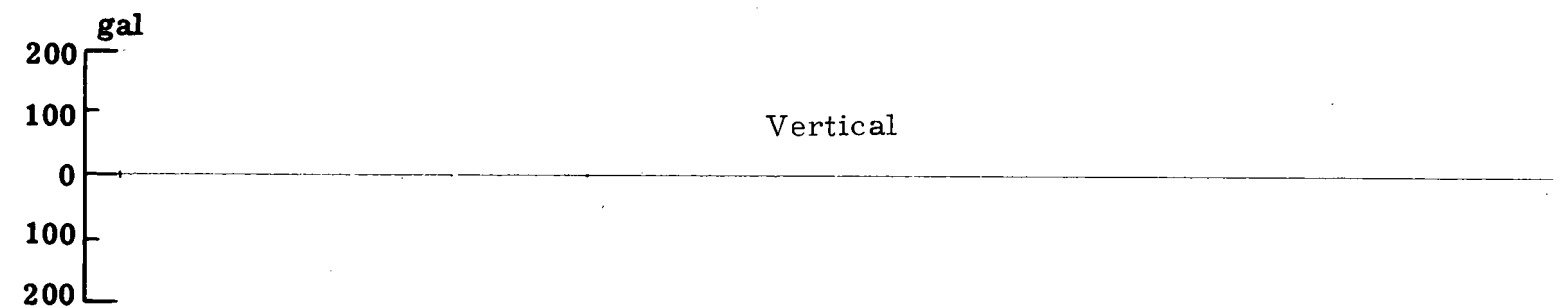
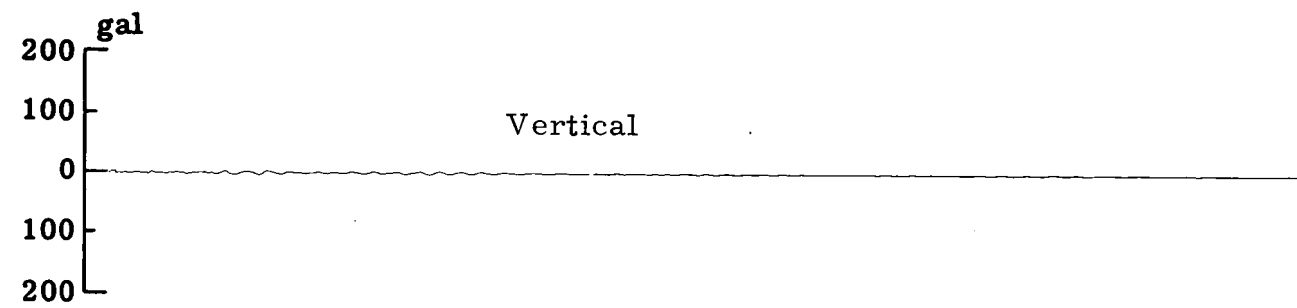
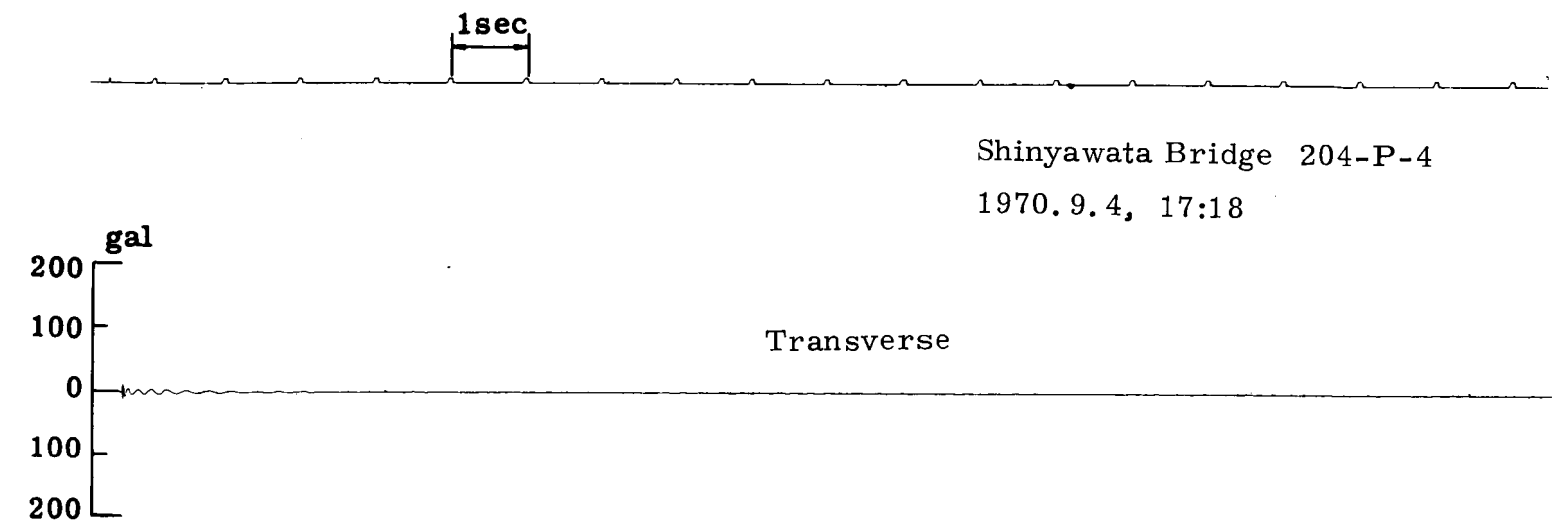
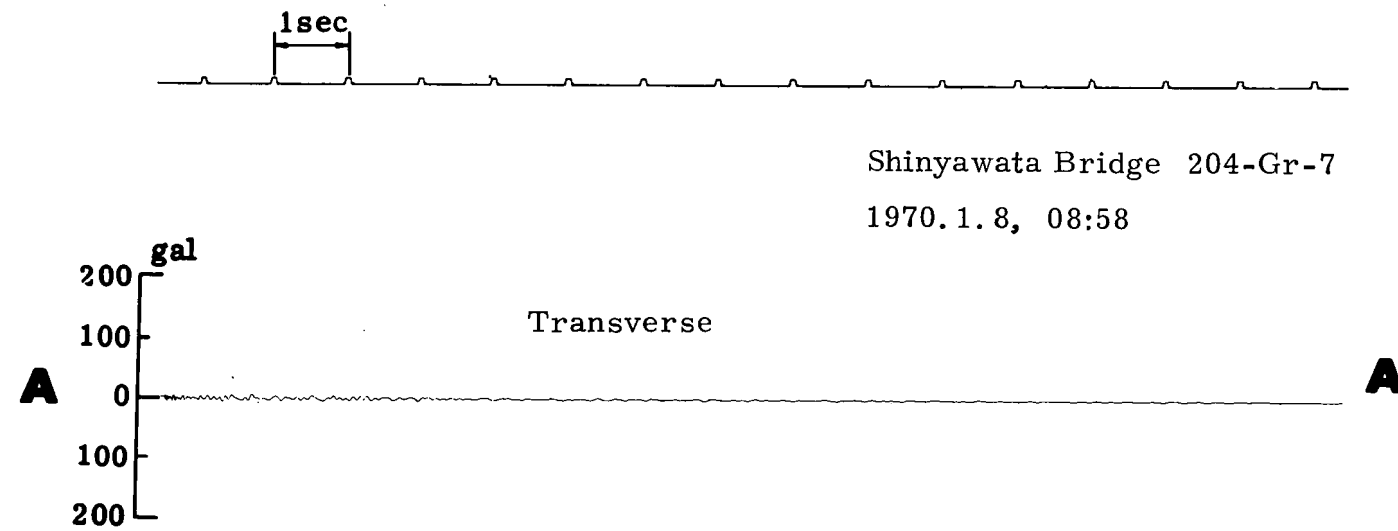
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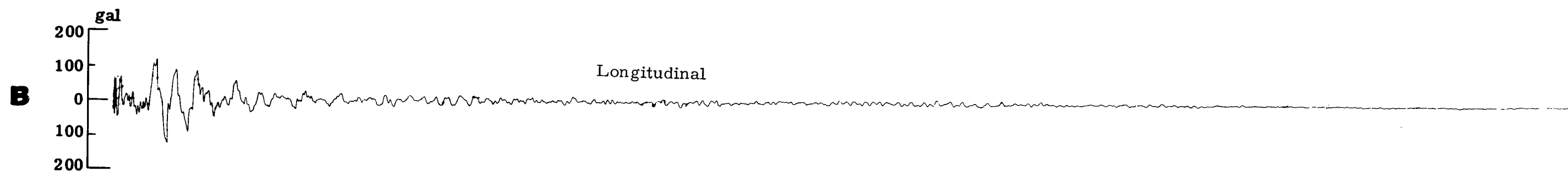
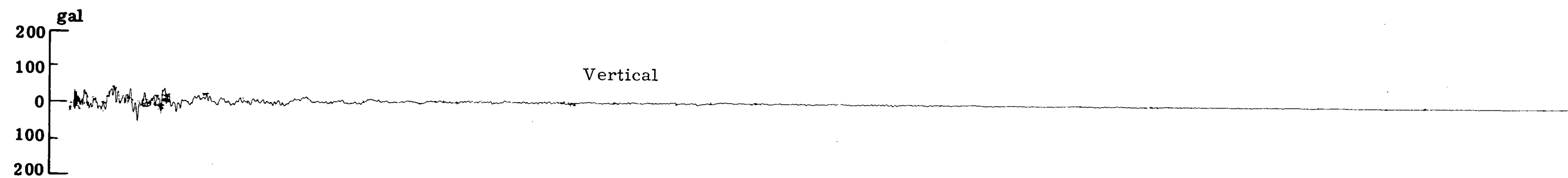
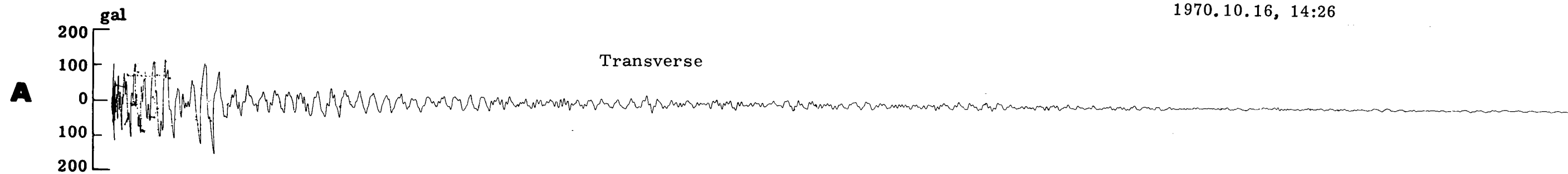
Saka Bridge 106-Gr-18
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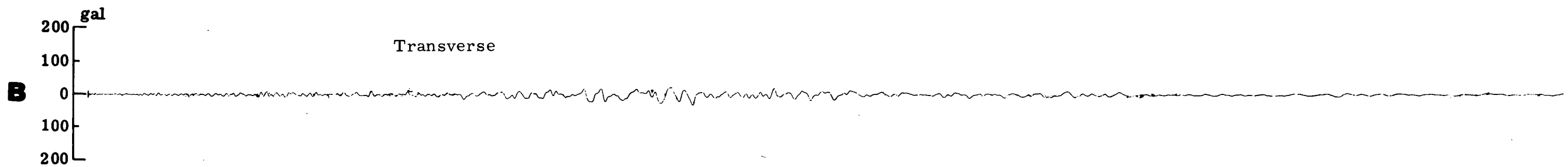
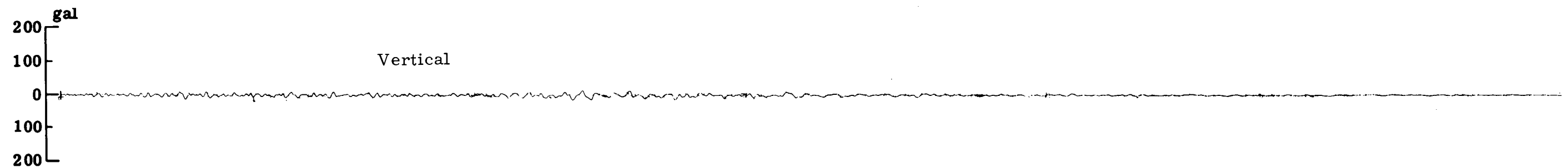
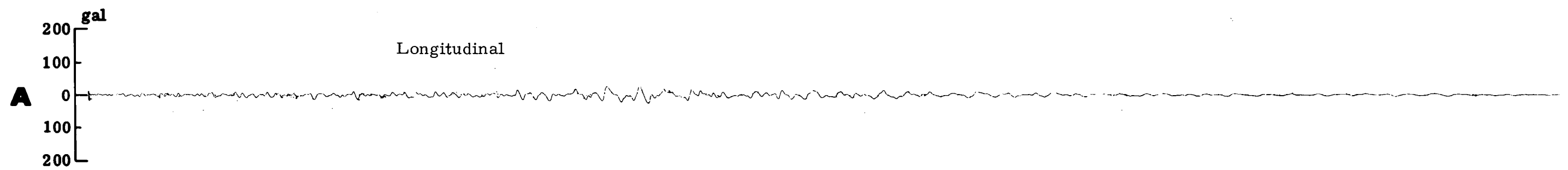


Wagagawa Bridge 113-P-1

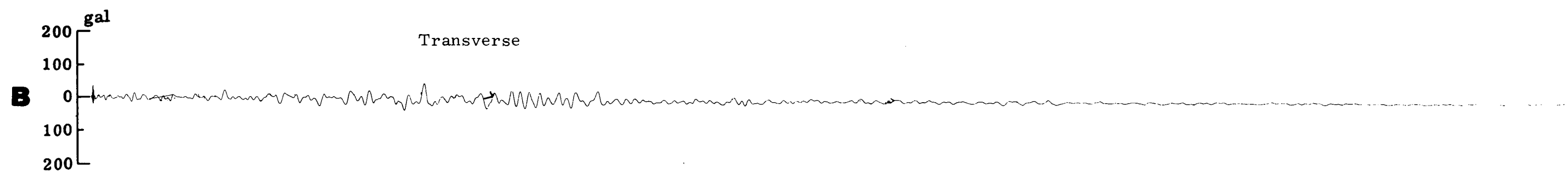
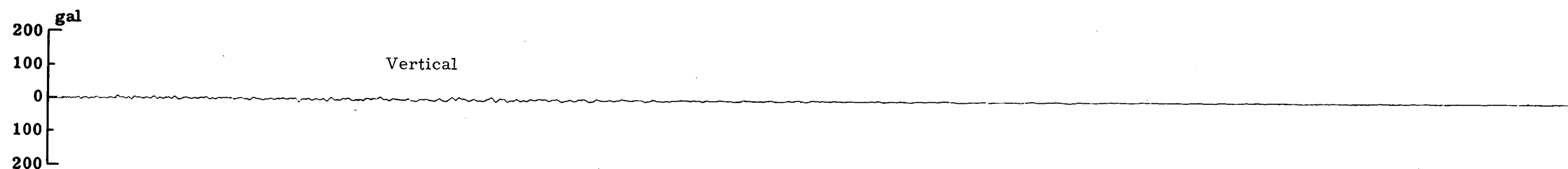
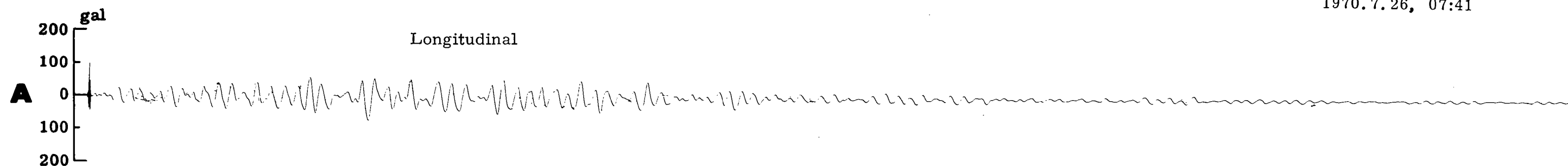
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Ishiseto Bridge 205-Gr-8
1970.7.26, 07:41



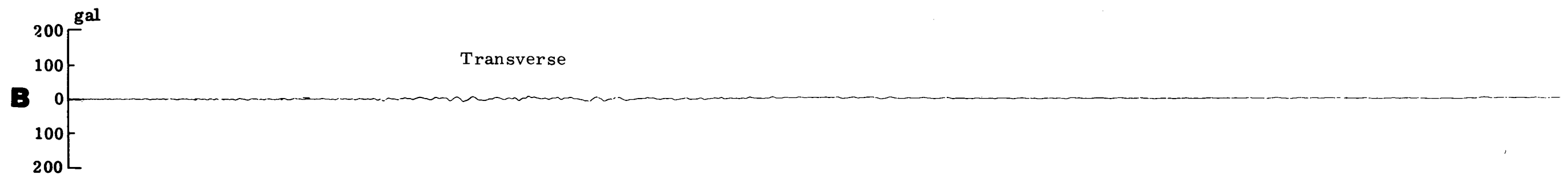
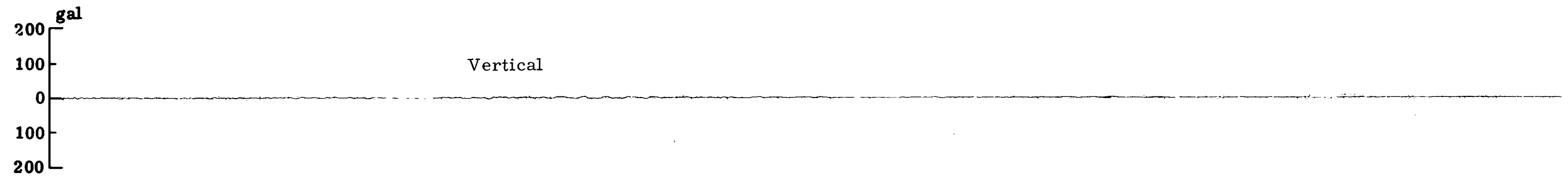
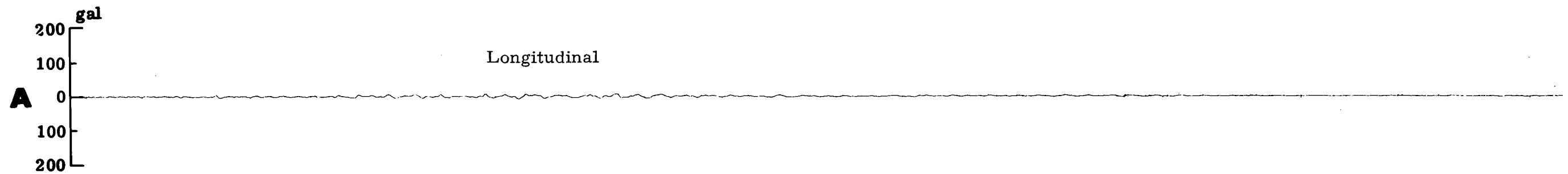
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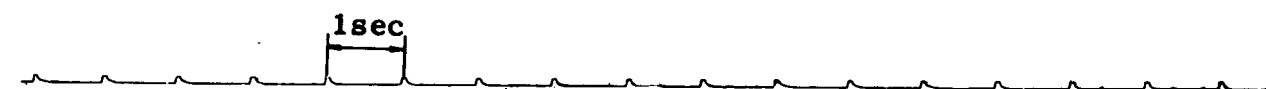
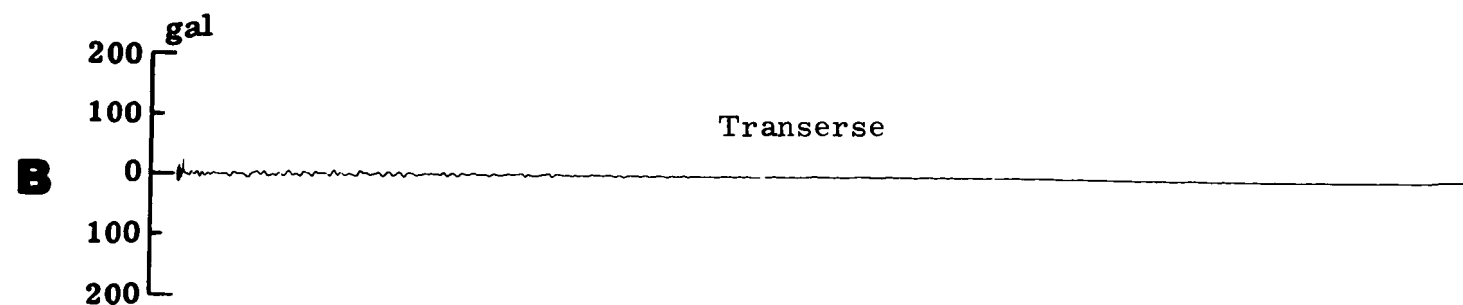
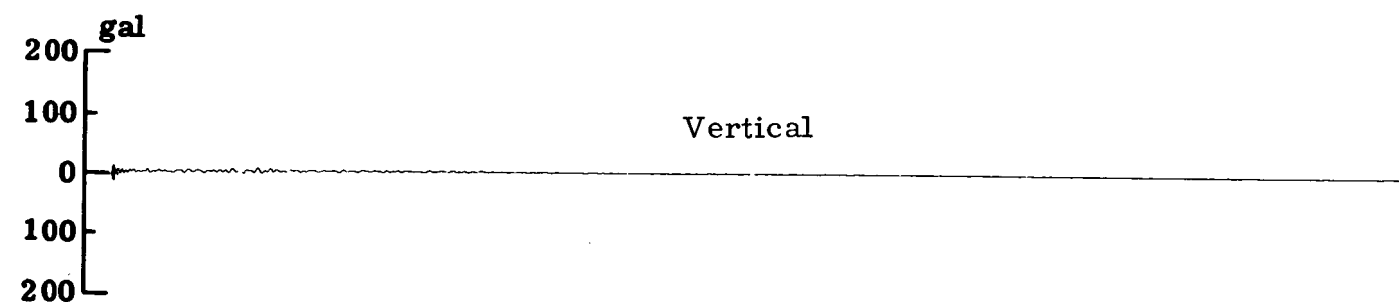
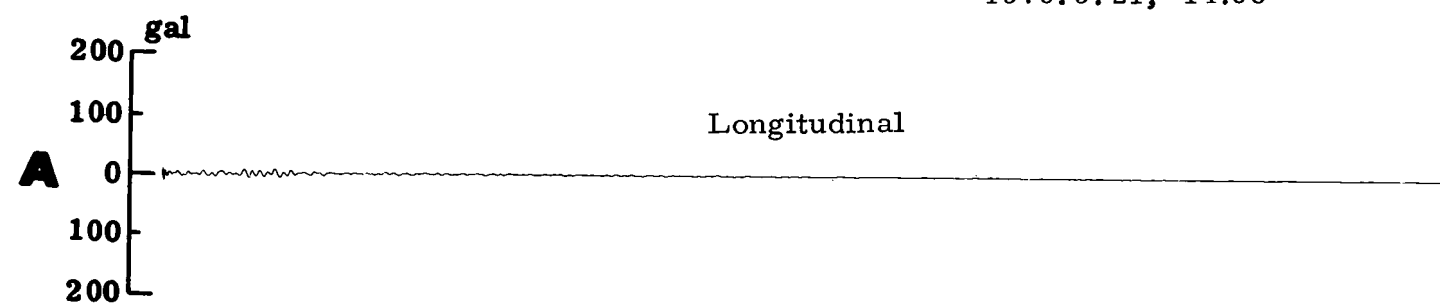
Ishiseto Bridge 205-Gr-10

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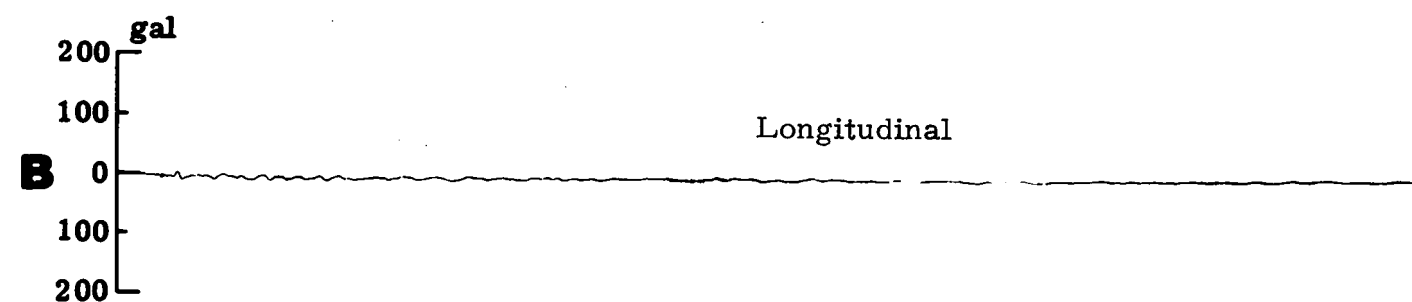
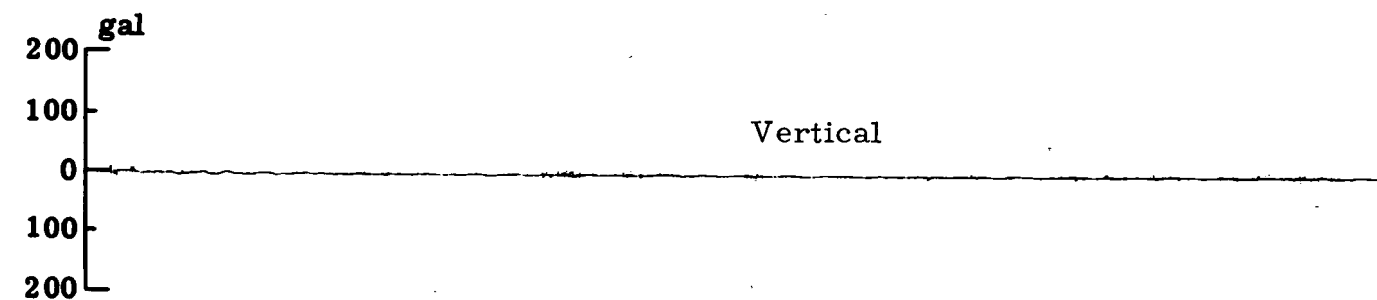
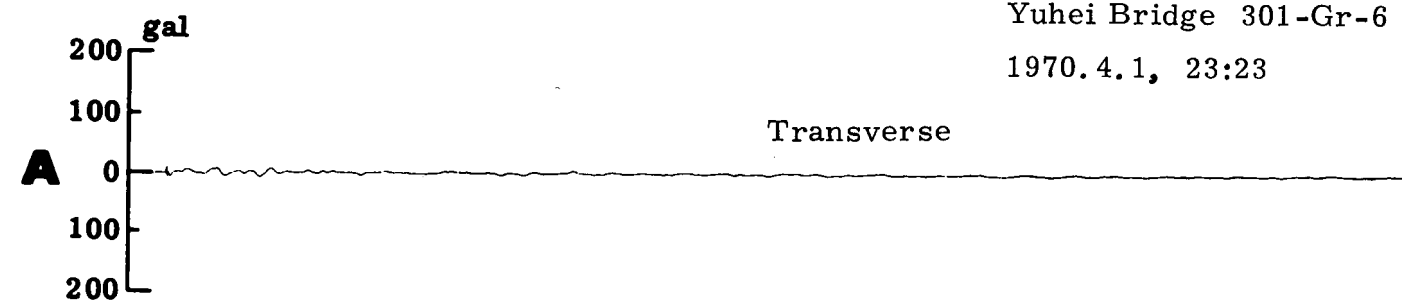




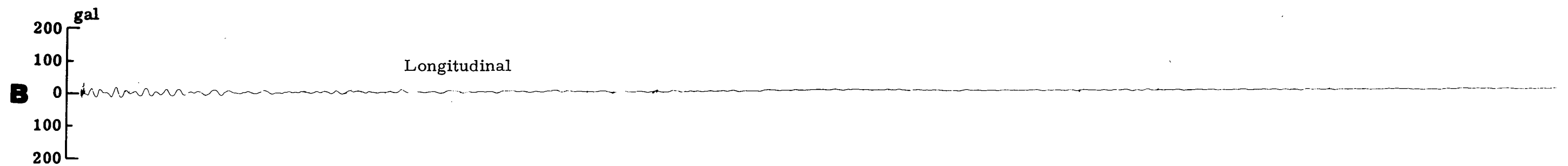
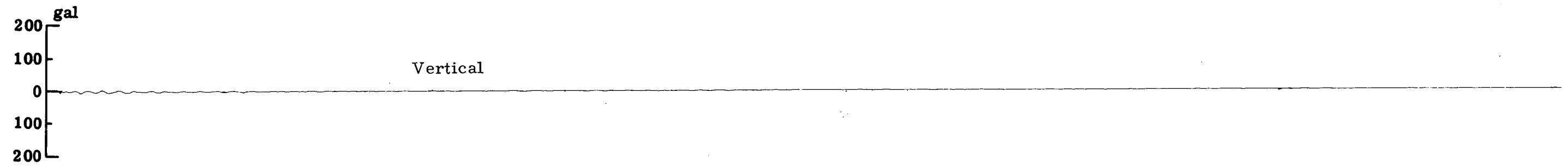
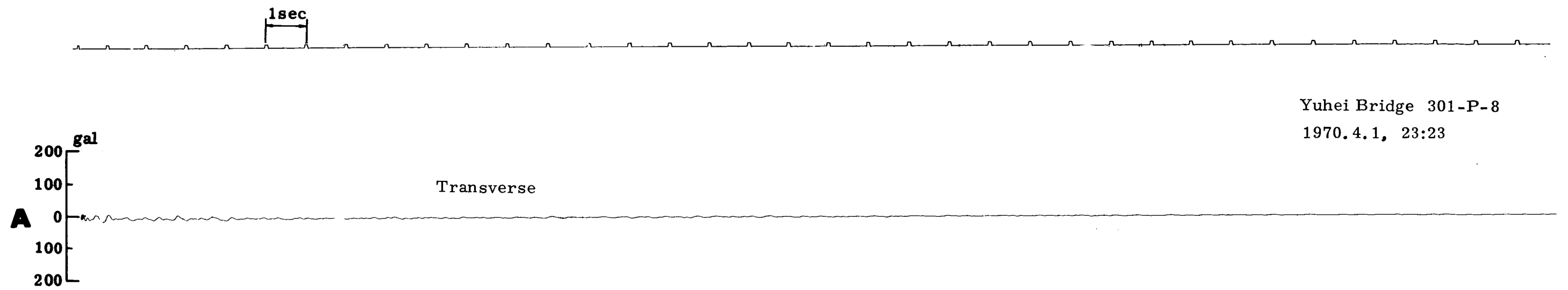
Ishiseto Bridge 205-Gr-11
1970.9.21, 14:08



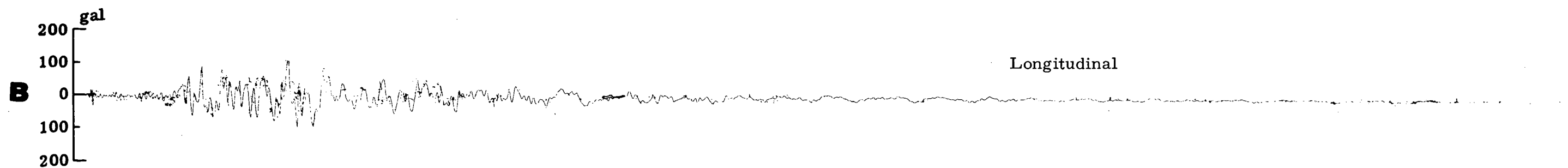
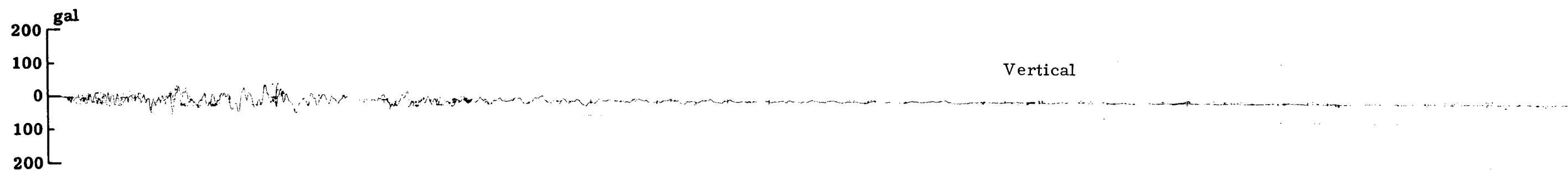
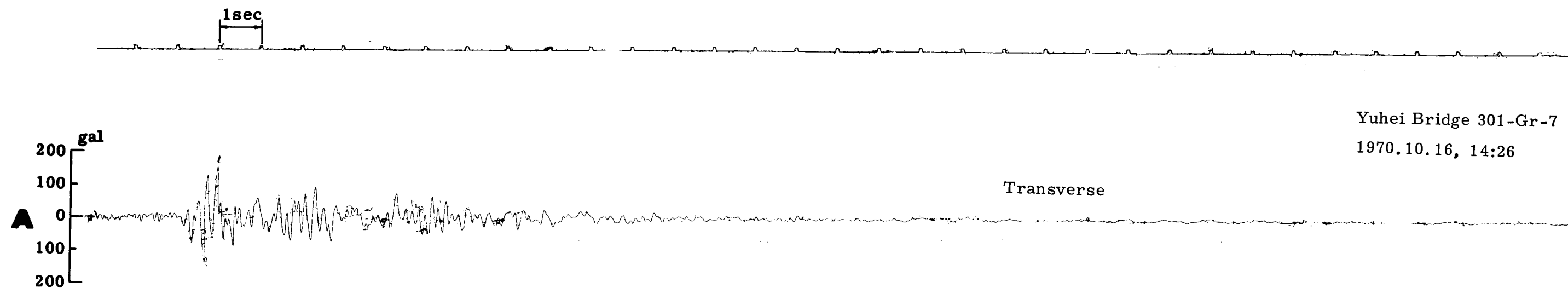
Yuhei Bridge 301-Gr-6
1970.4.1, 23:23



Yuhei Bridge 301-P-8
1970.4.1, 23:23



Yuhei Bridge 301-Gr-7
1970.10.16, 14:26



1sec

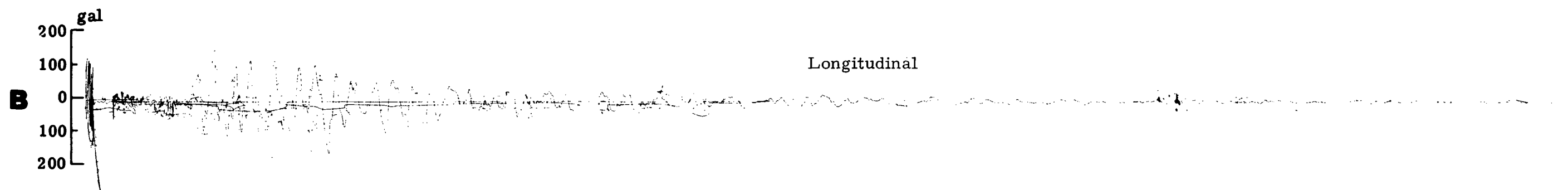
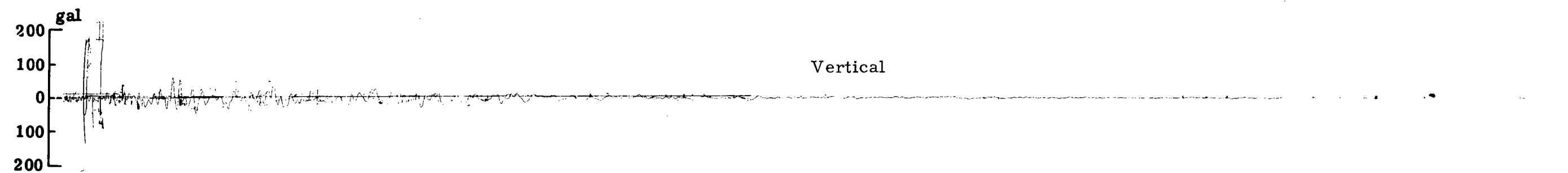
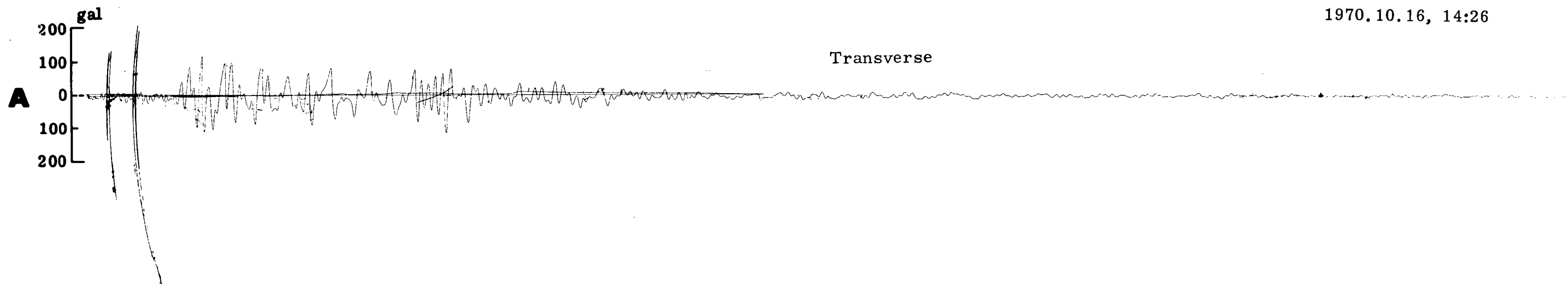
Yuhei Bridge 301-P-9

1970.10.16, 14:26

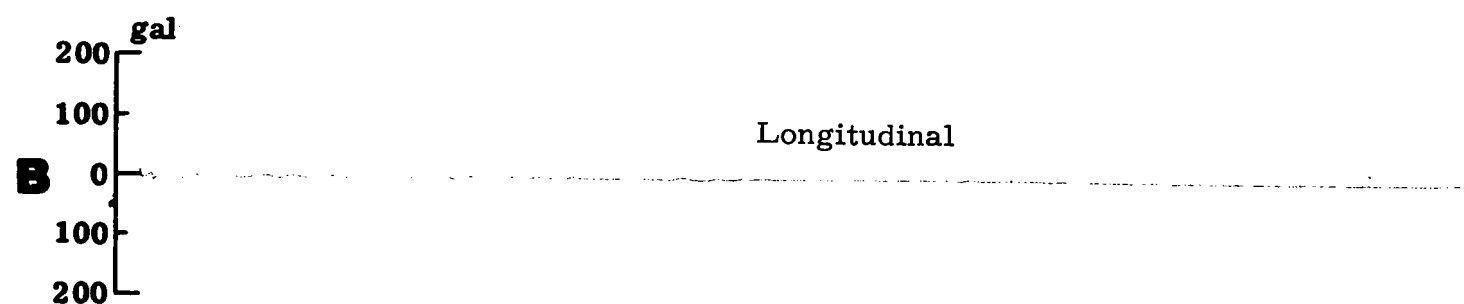
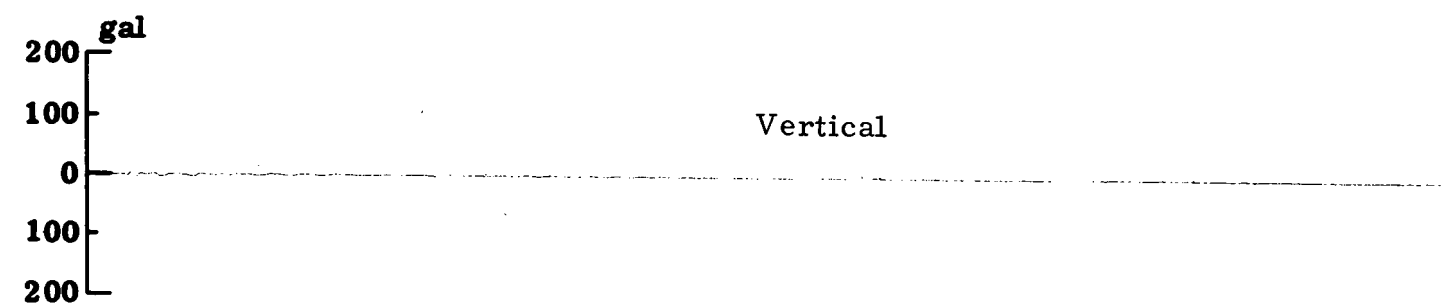
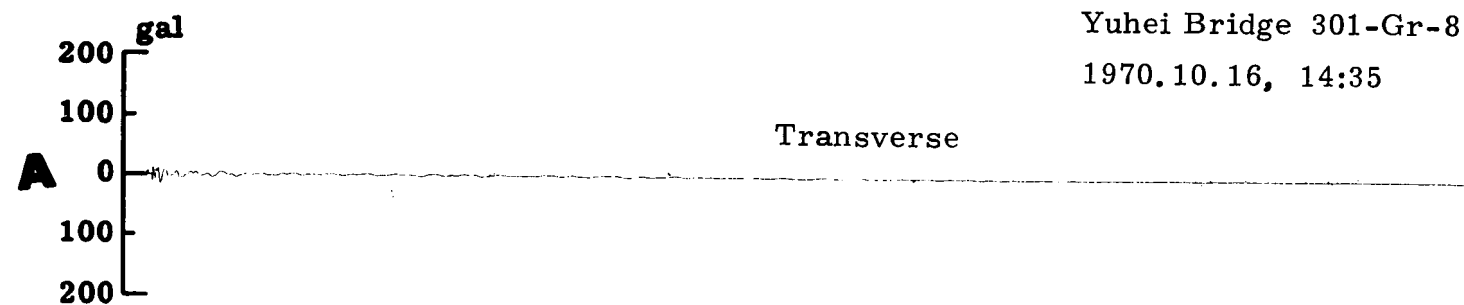
Transverse

Vertical

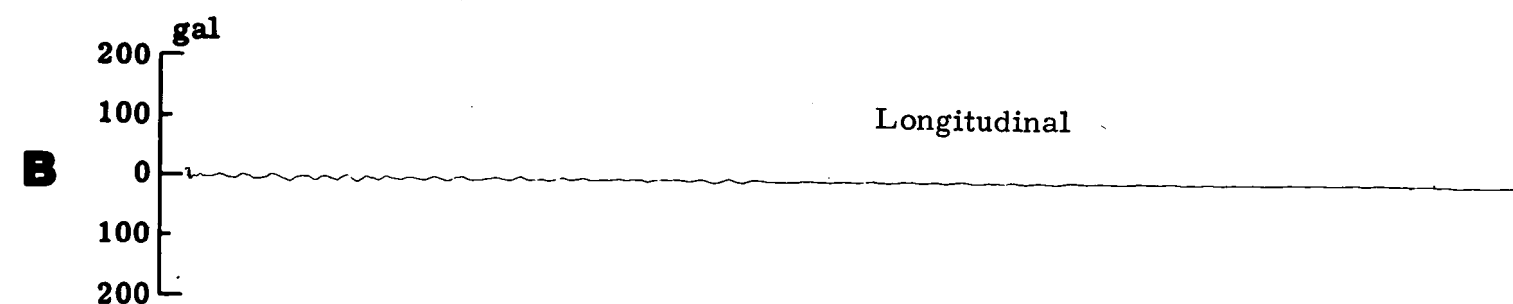
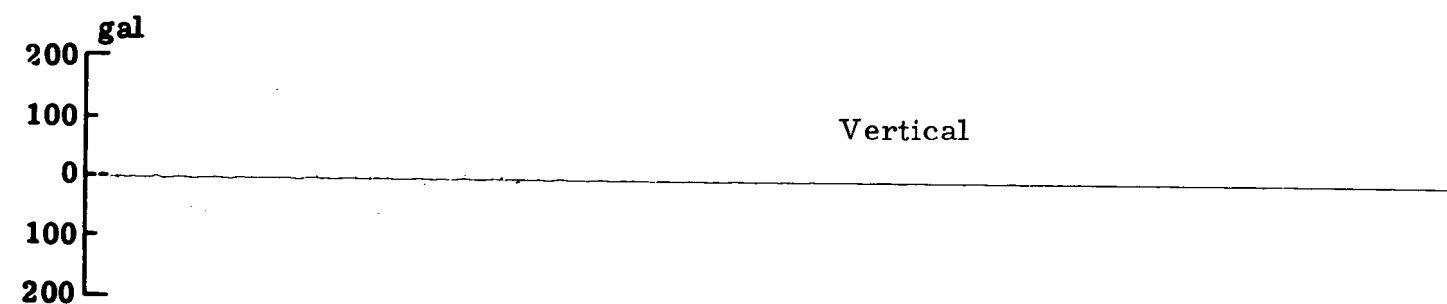
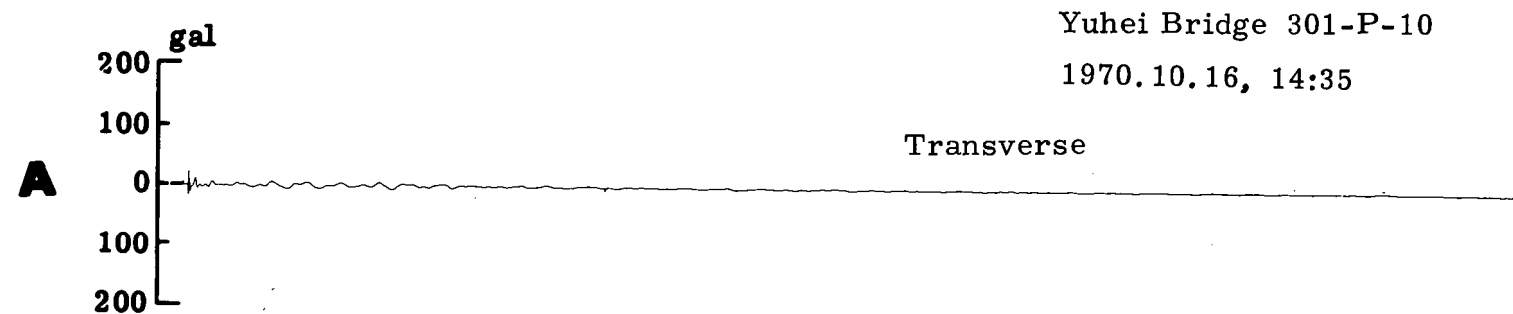
Longitudinal

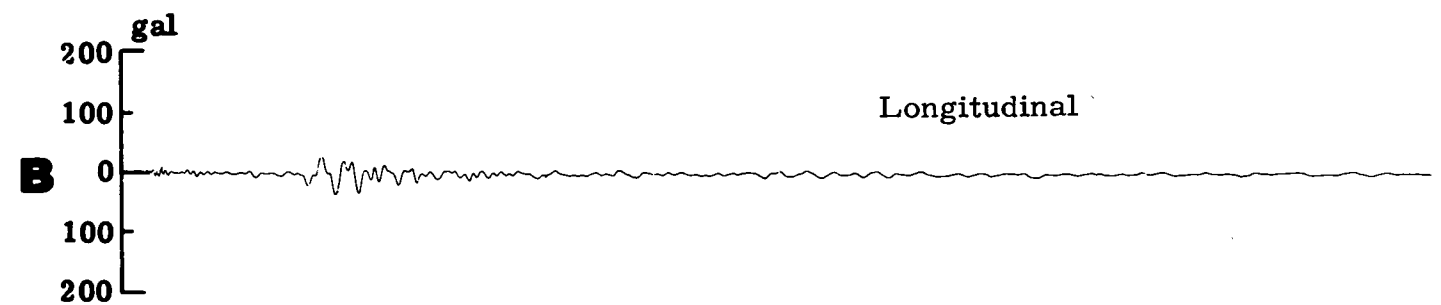
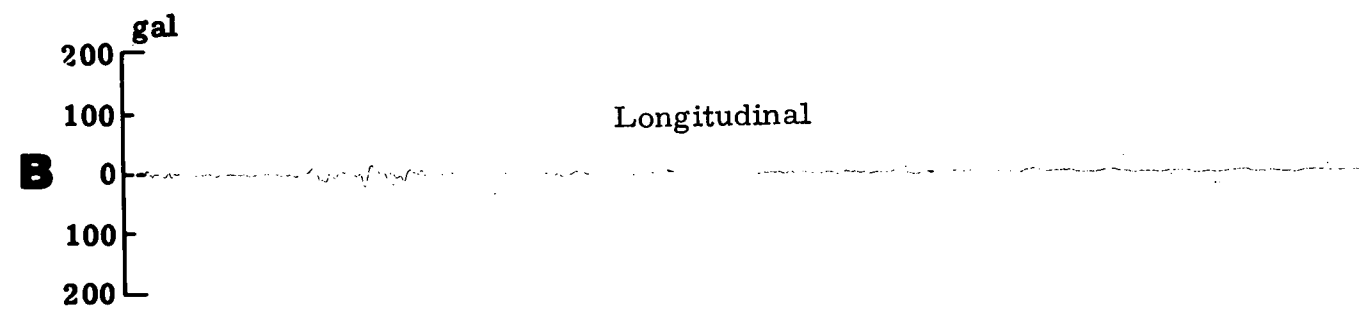
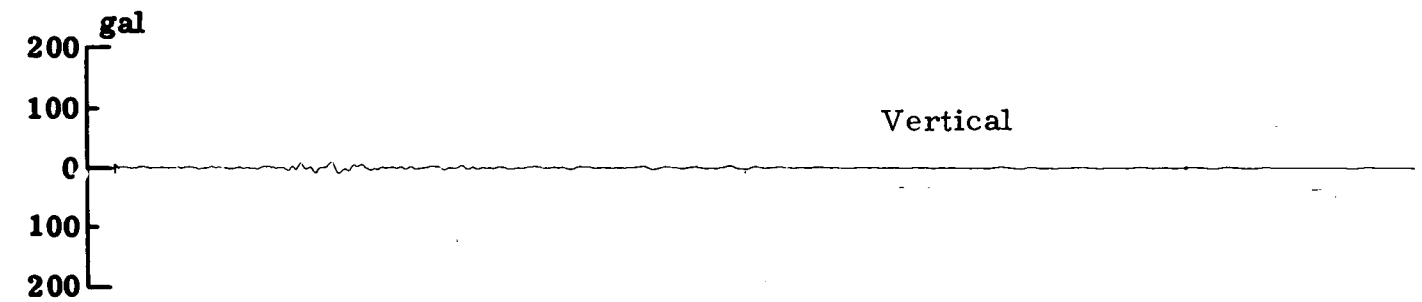
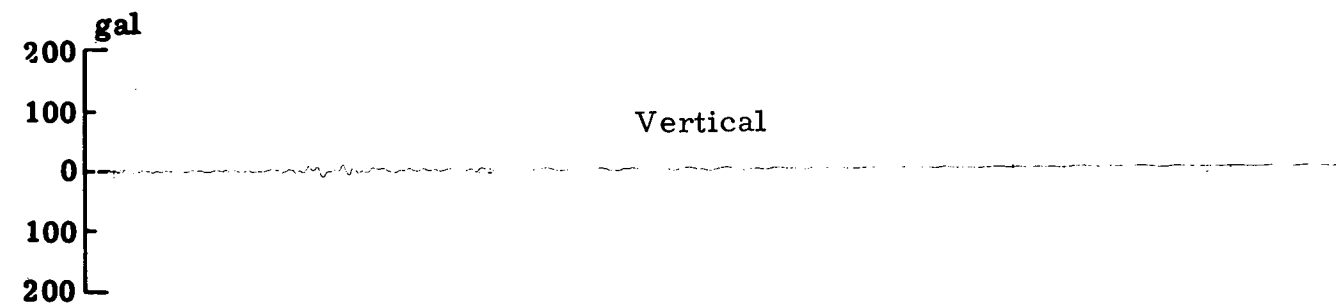
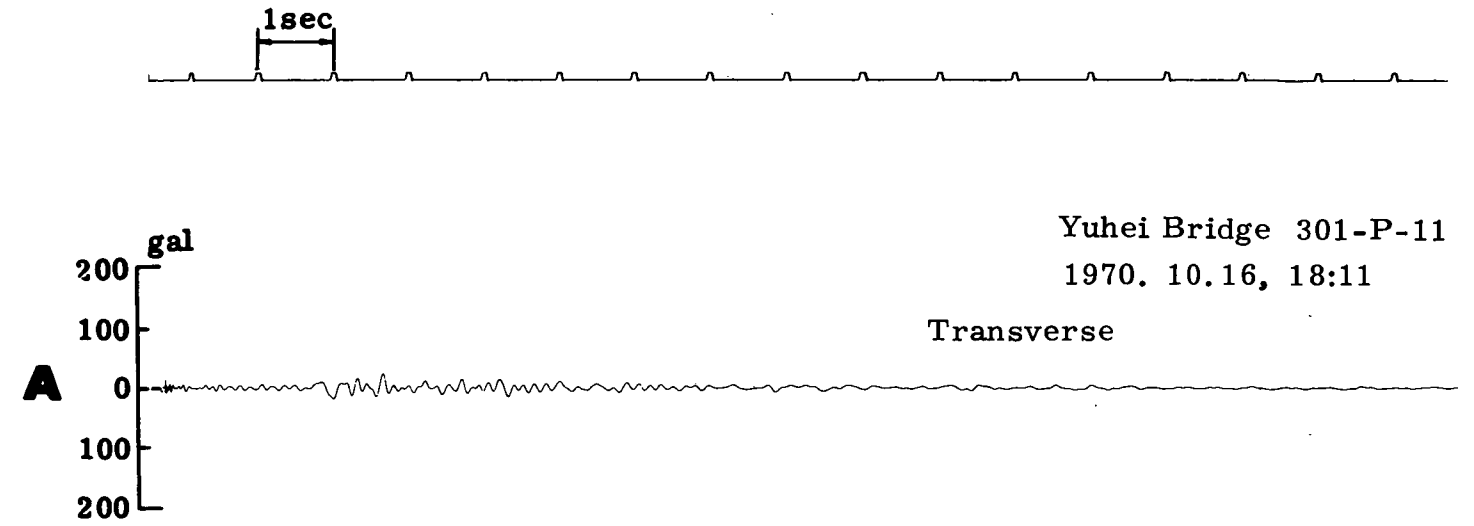
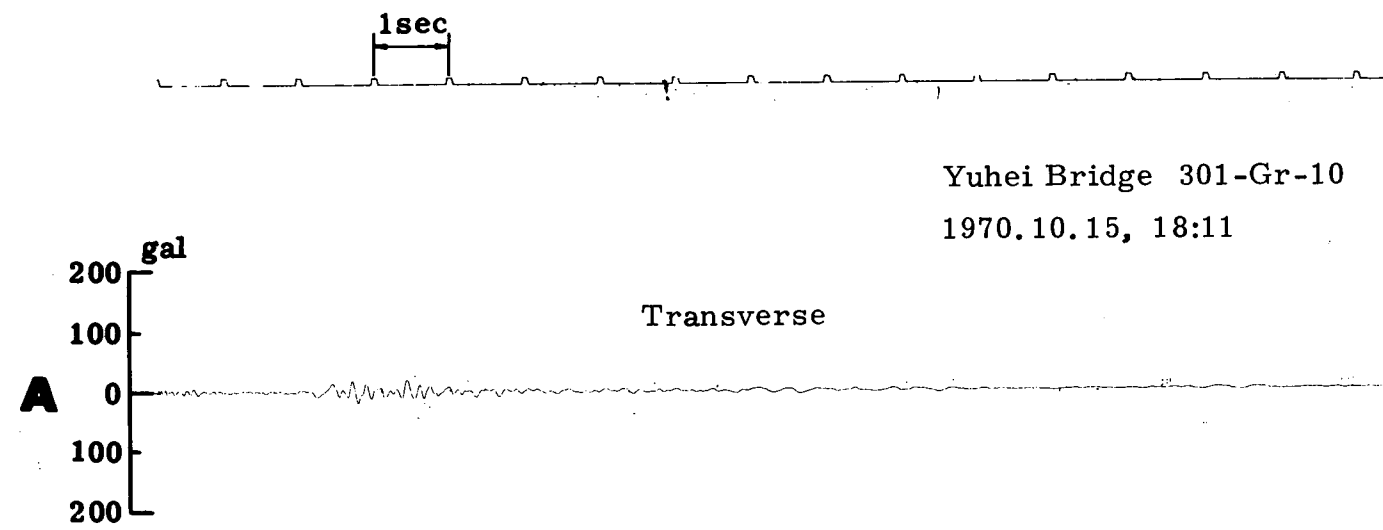


1sec



1sec

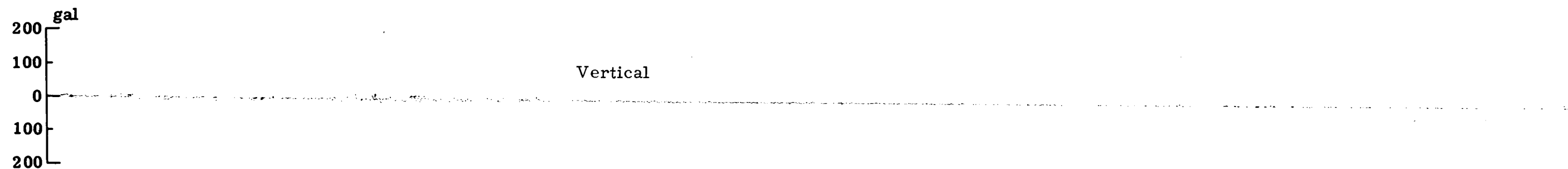
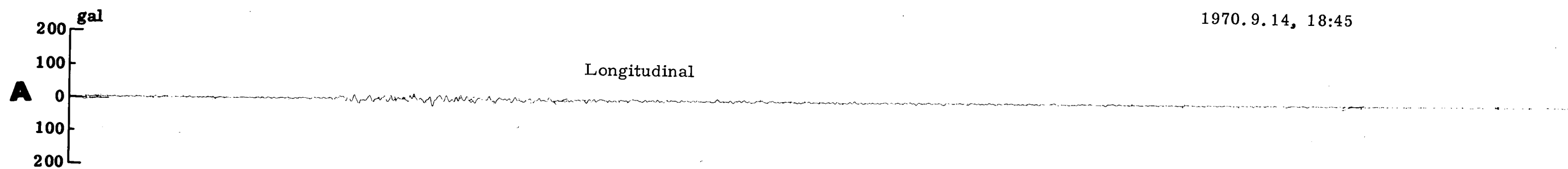




1sec

Kaihoku Bridge 302-Gr-22

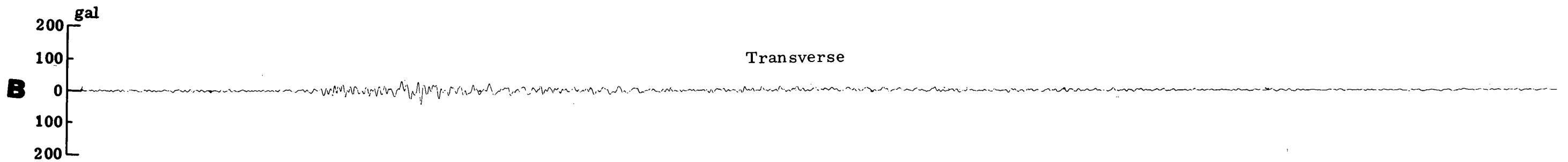
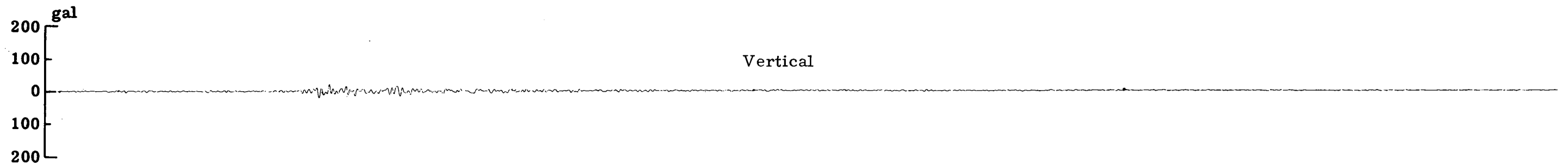
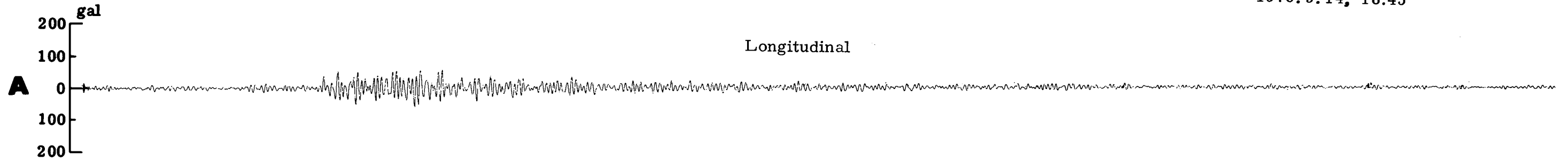
1970.9.14, 18:45



1sec

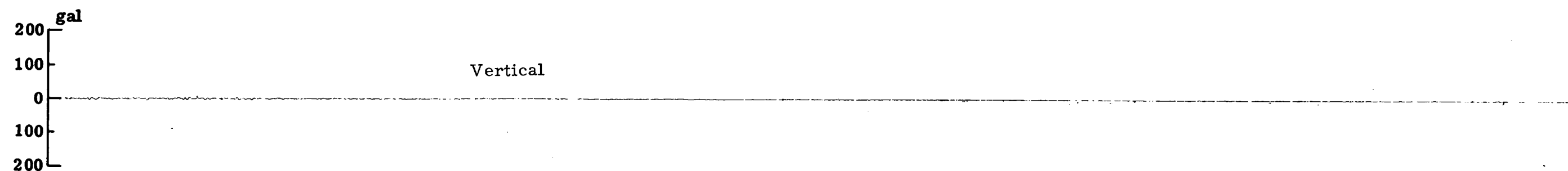
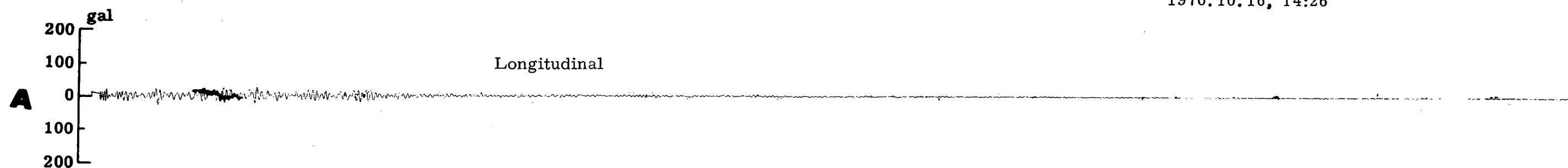
Kaihoku Bridge 302-P-27

1970.9.14, 18:45



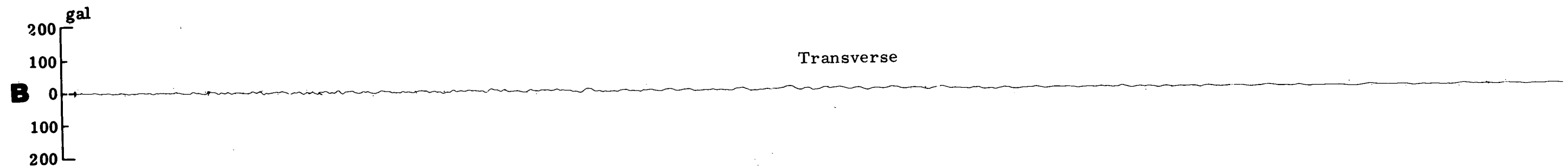
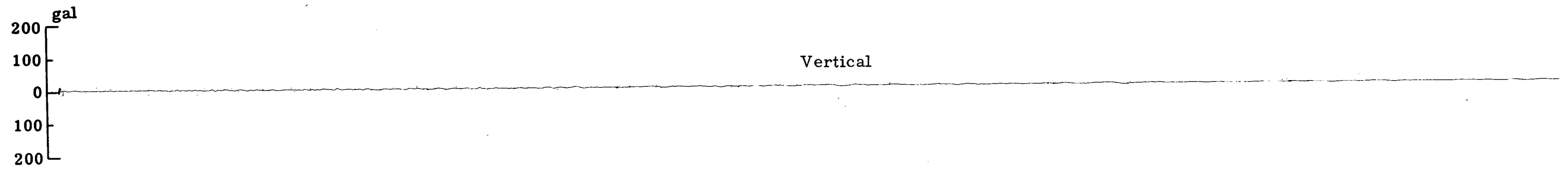
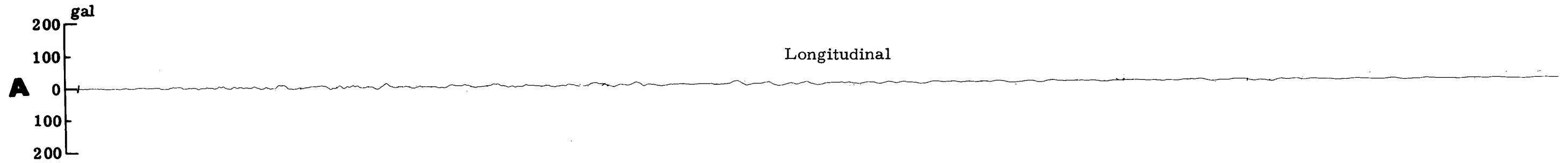
1sec

Kaihoku Bridge 302-P-28
1970.10.16, 14:26



1sec

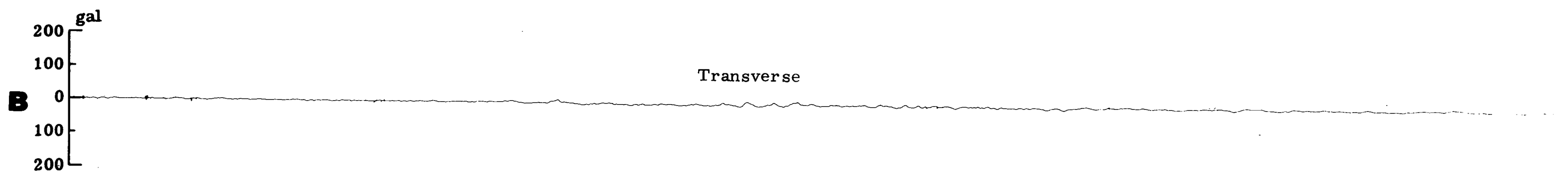
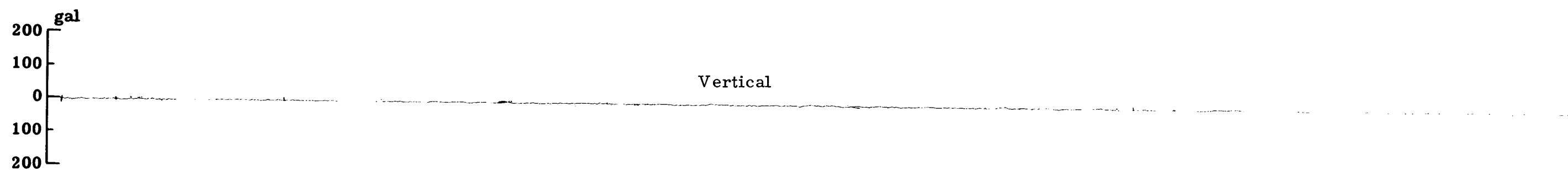
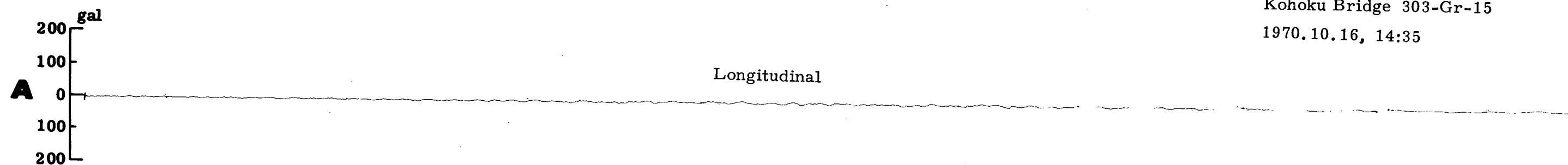
Kahoku Bridge 303-Gr-14
1970.10.16, 14:26



1sec

Kohoku Bridge 303-Gr-15

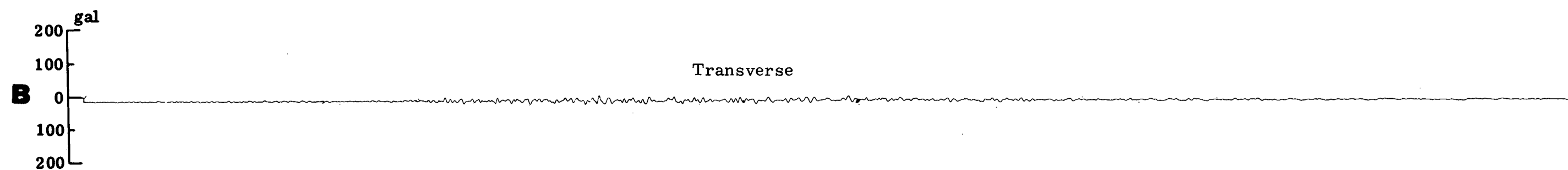
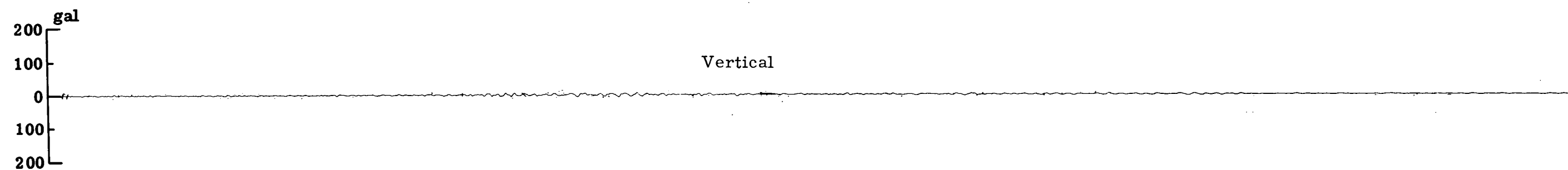
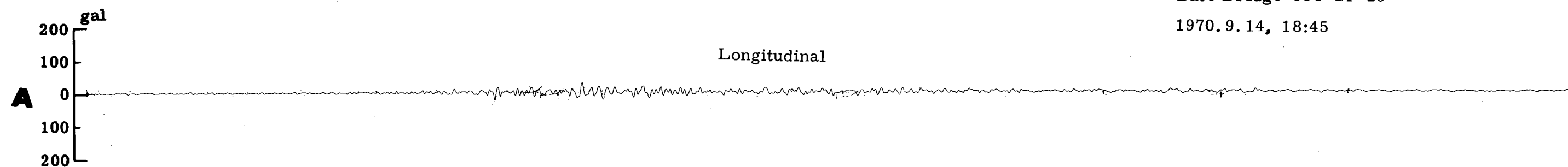
1970.10.16, 14:35



1sec

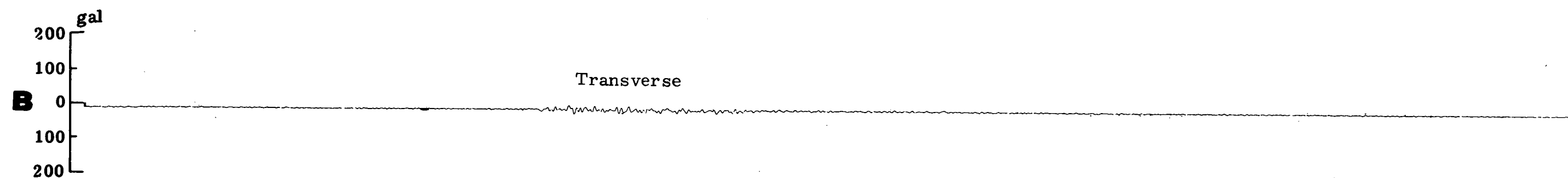
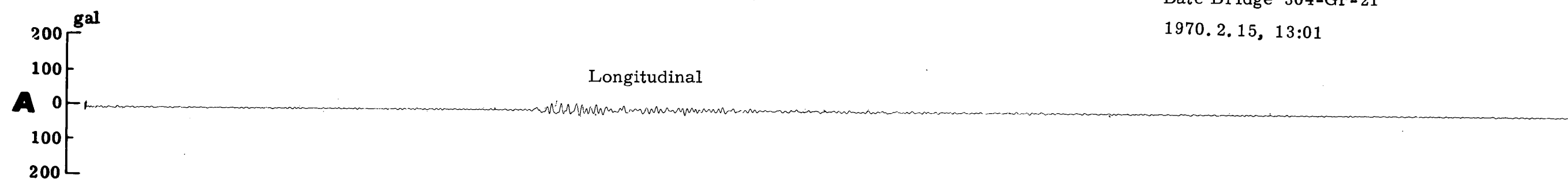
Date Bridge 304-Gr-23

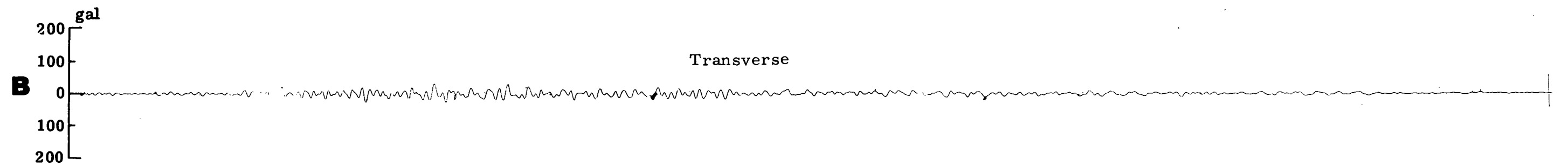
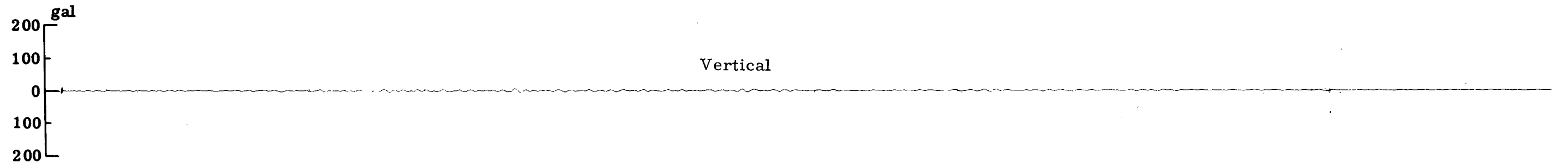
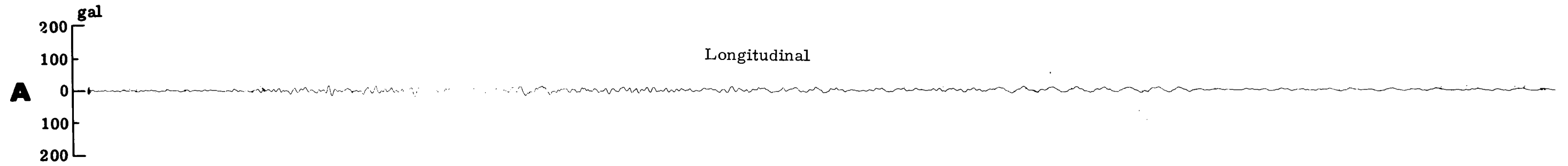
1970.9.14, 18:45



Date Bridge 304-Gr-21

1970.2.15, 13:01





1sec

Myoken Bridge 306-Gr-3

1970.7.26, 07:41

Transverse

A gal
200
100
0
100
200

Vertical

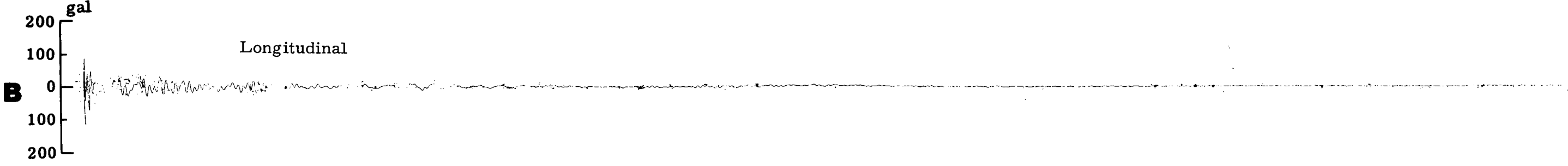
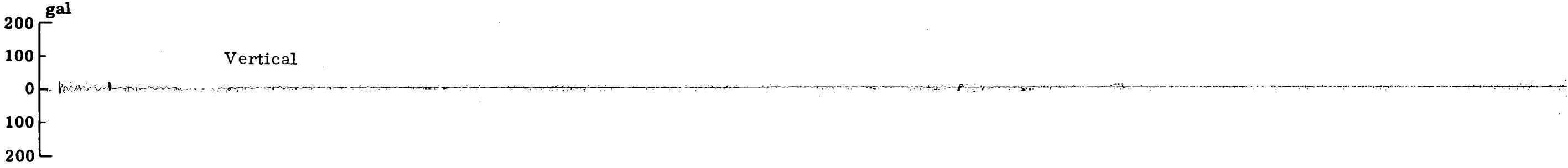
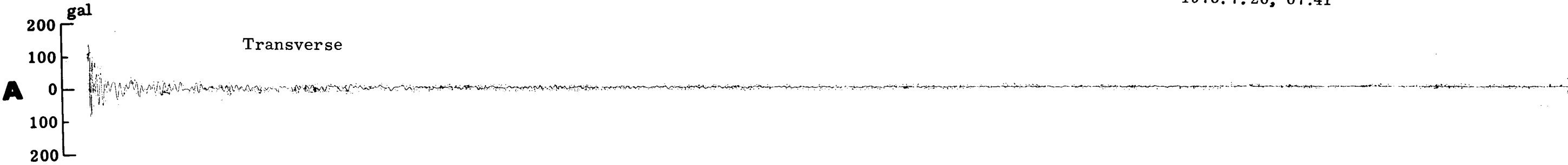
gal
200
100
0
100
200

Longitudinal

B gal
200
100
0
100
200

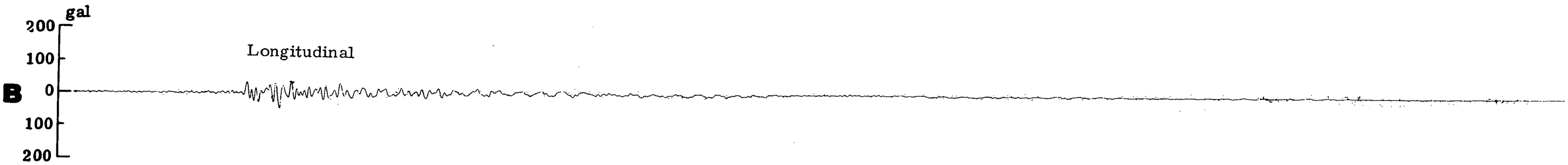
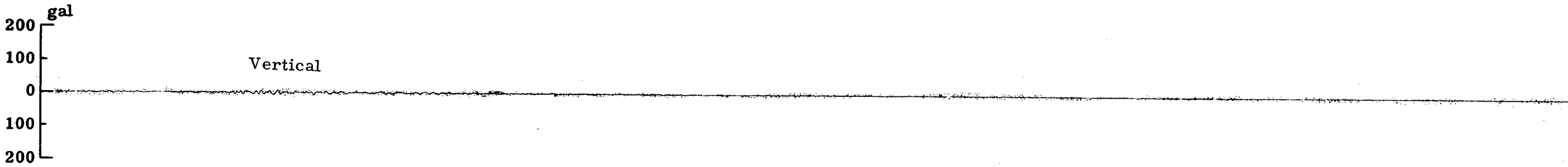
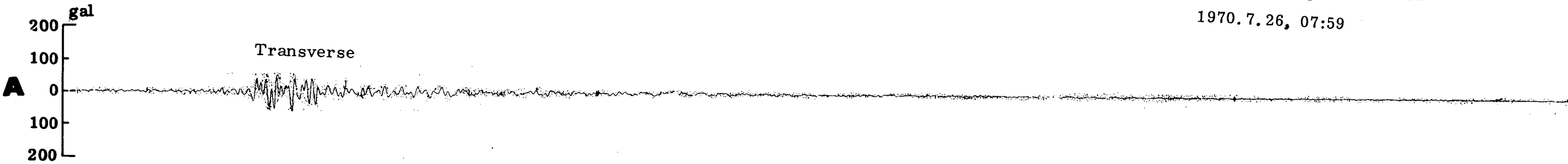
1sec

Itajima Bridge 308-Gr-11
1970.7.26, 07:41



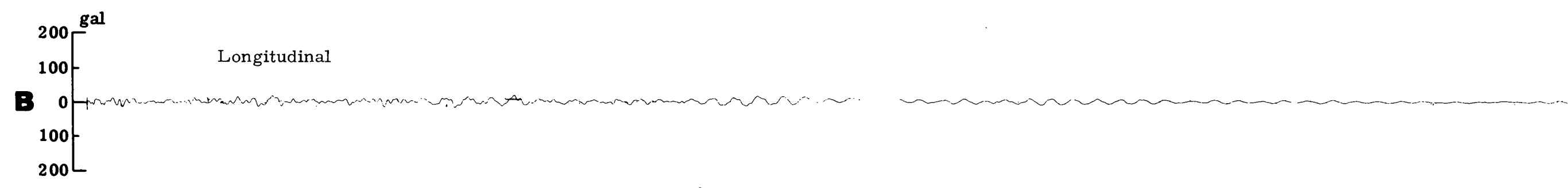
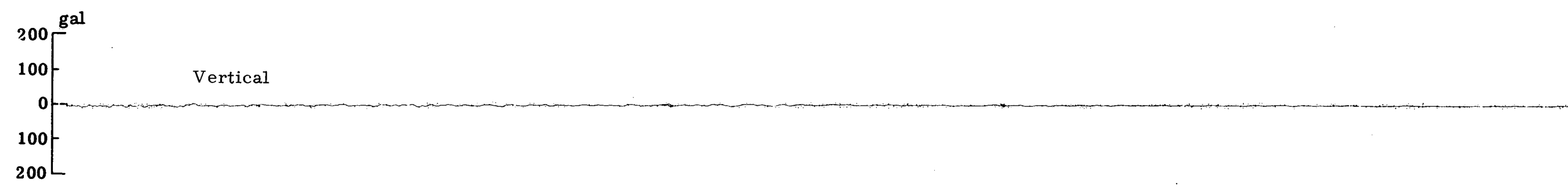
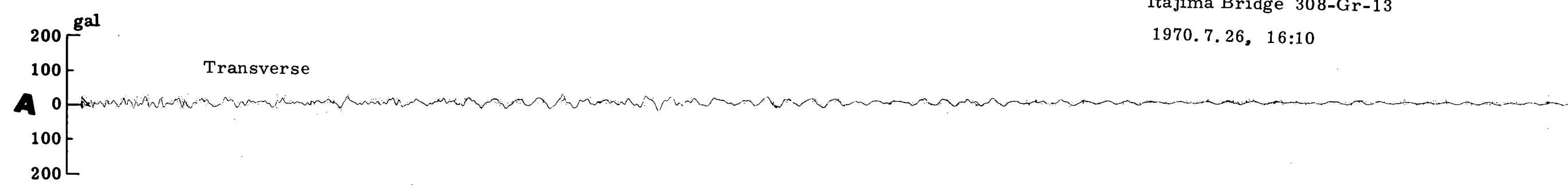
1sec

Itajima Bridge 308-Gr-12
1970.7.26, 07:59



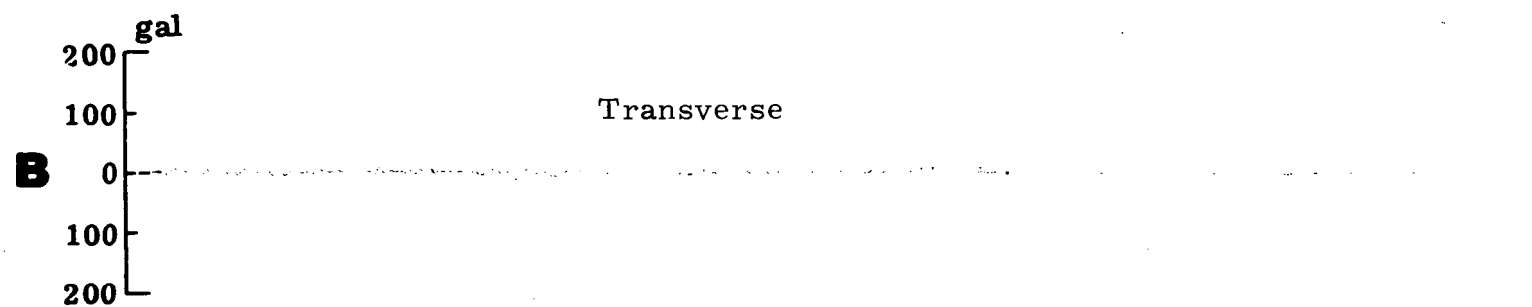
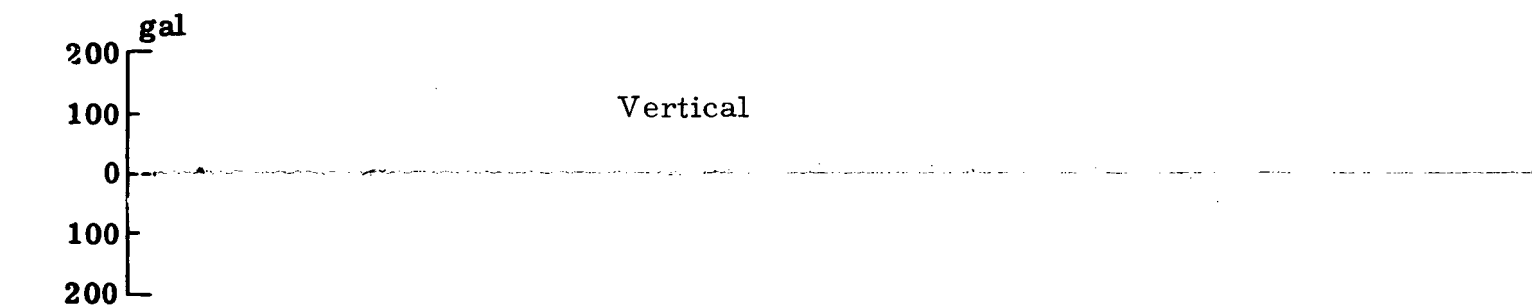
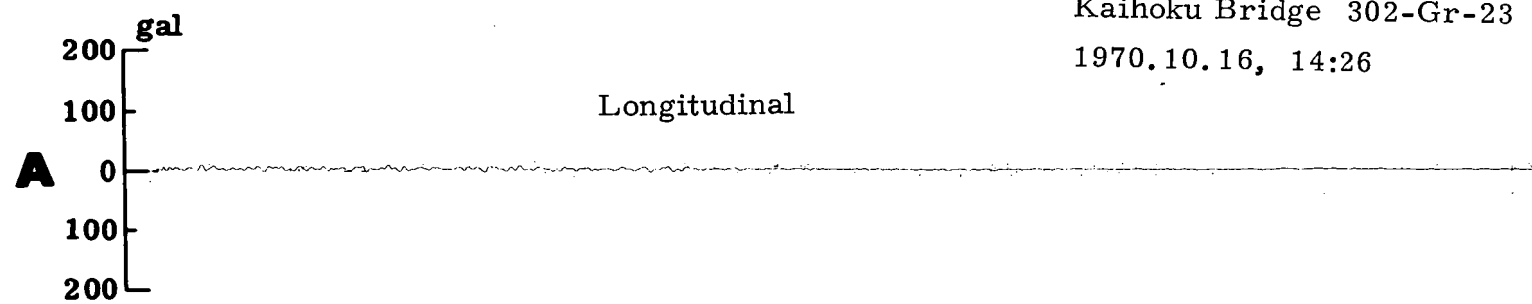
1sec

Itajima Bridge 308-Gr-13
1970.7.26, 16:10

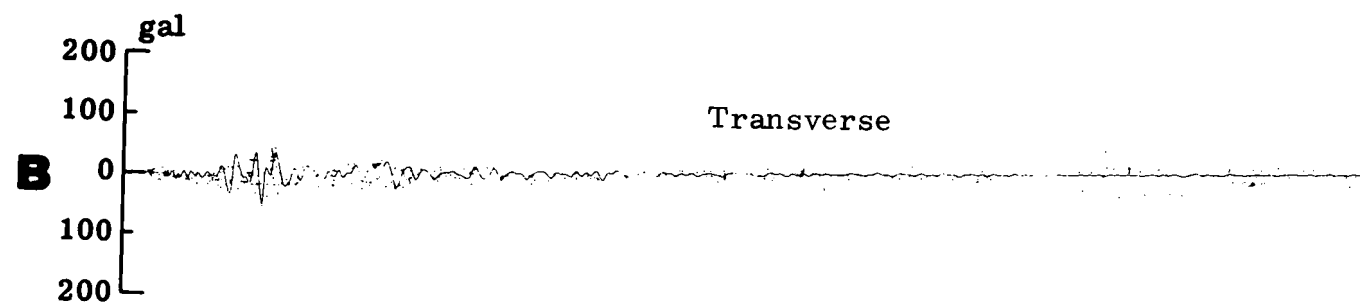
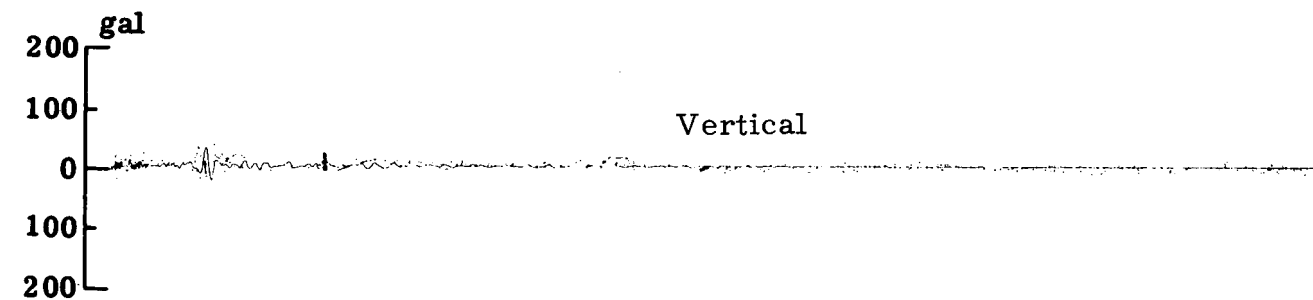
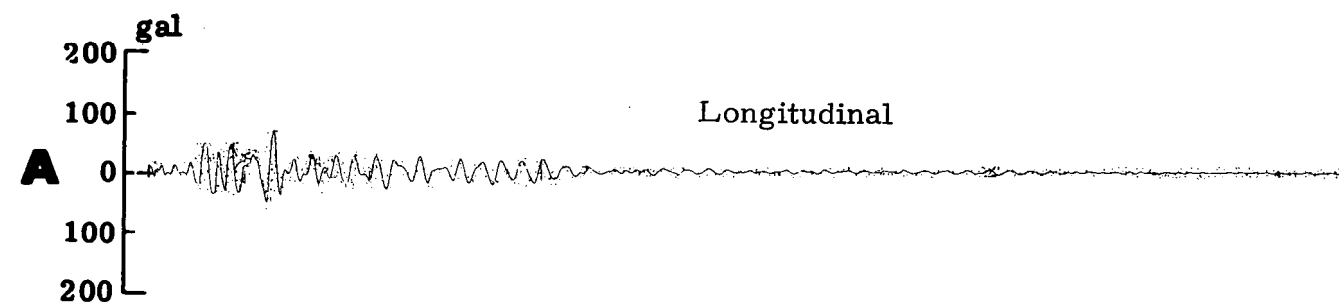


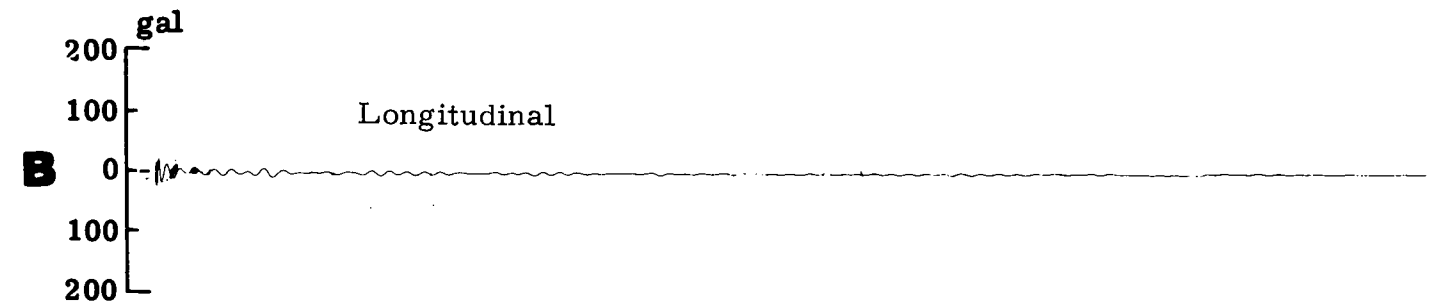
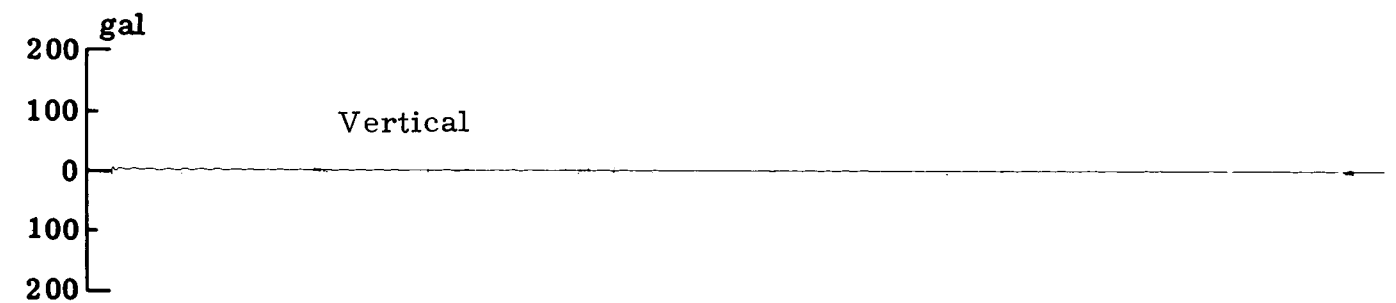
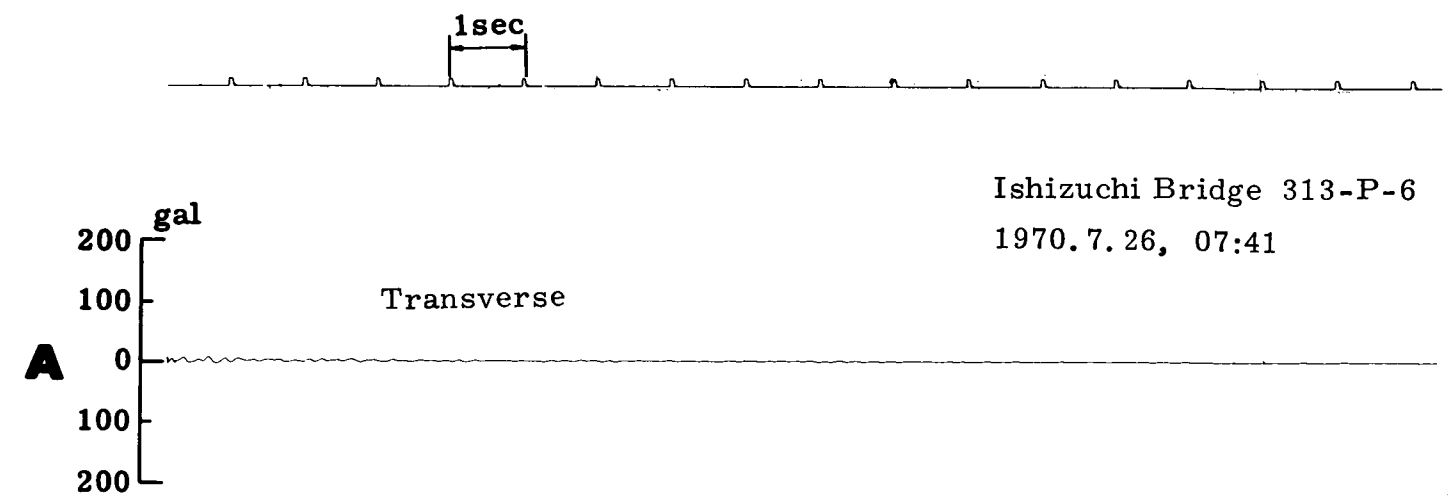
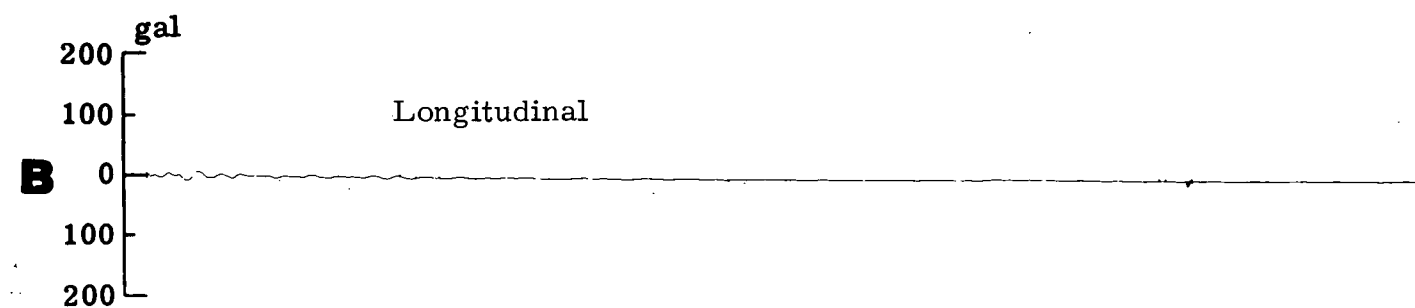
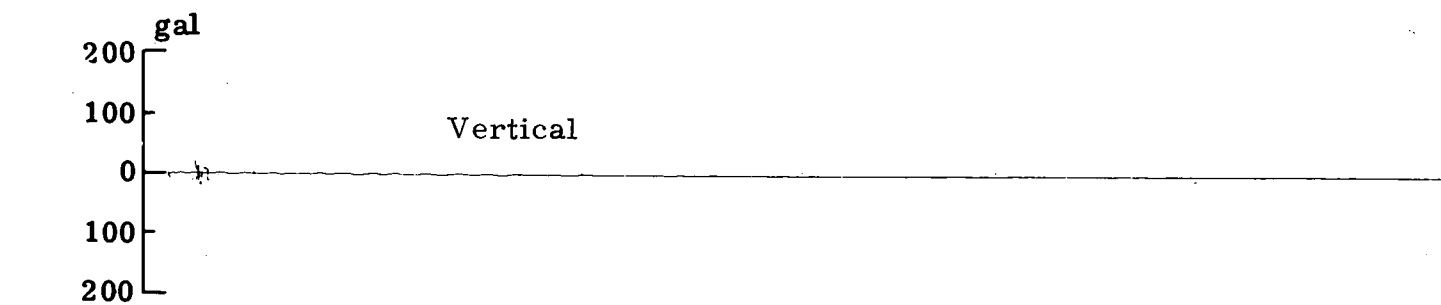
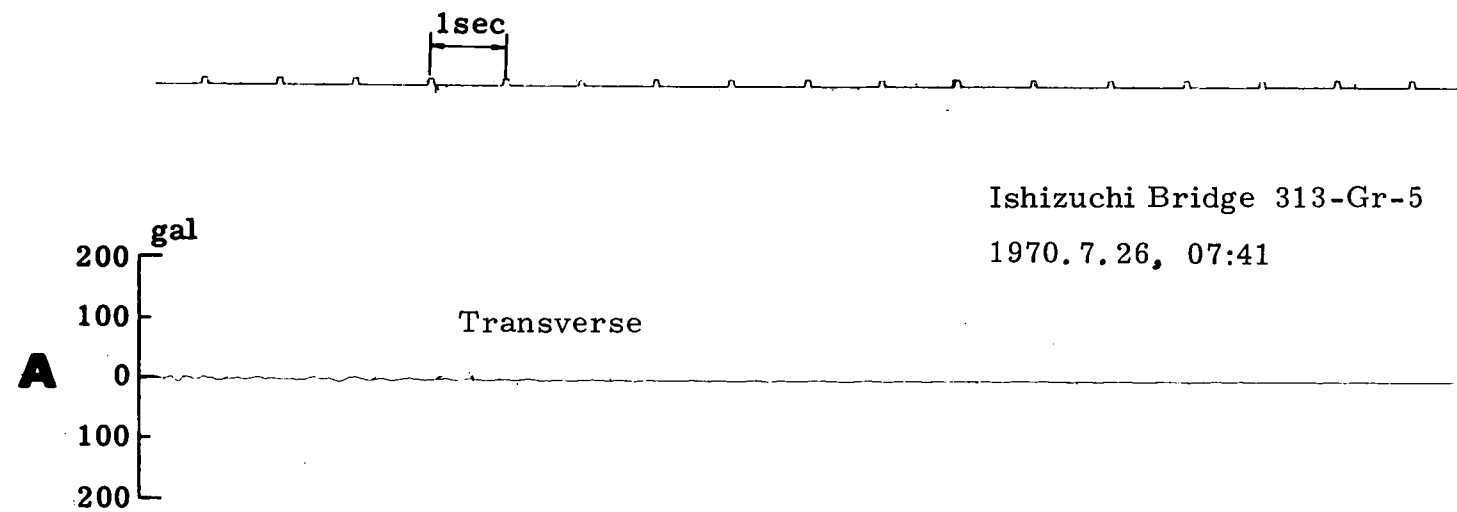
1sec

Kaihoku Bridge 302-Gr-23
1970.10.16, 14:26

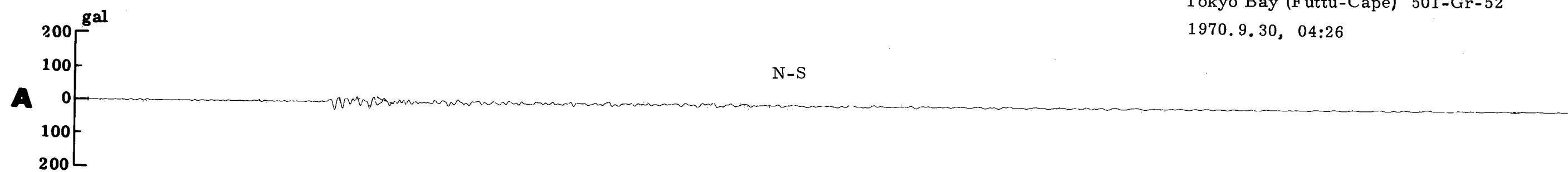


1sec



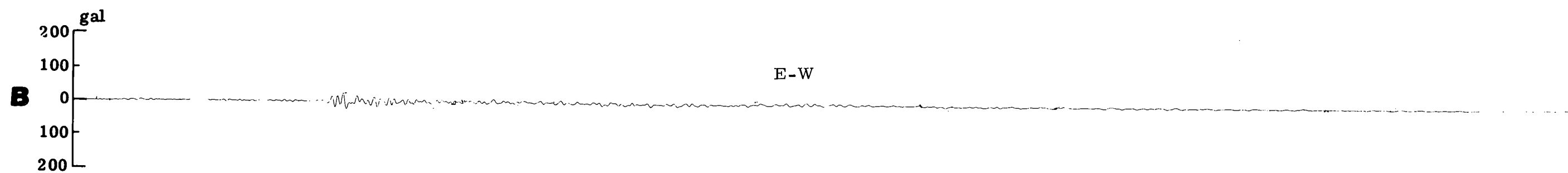
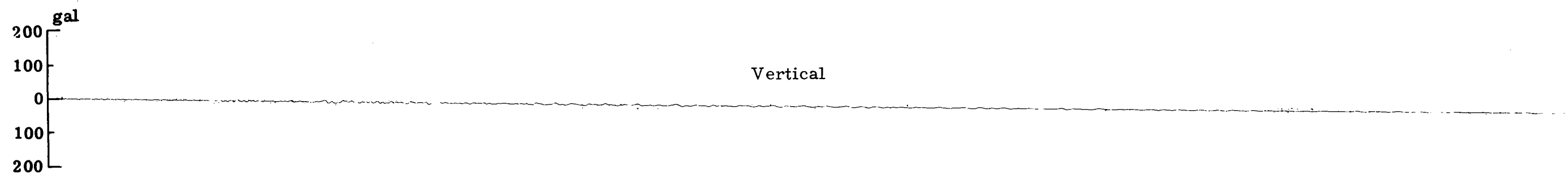


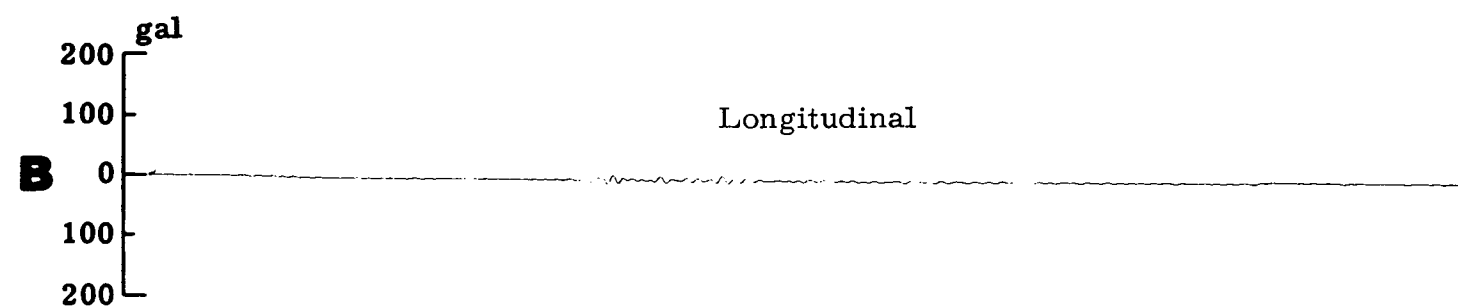
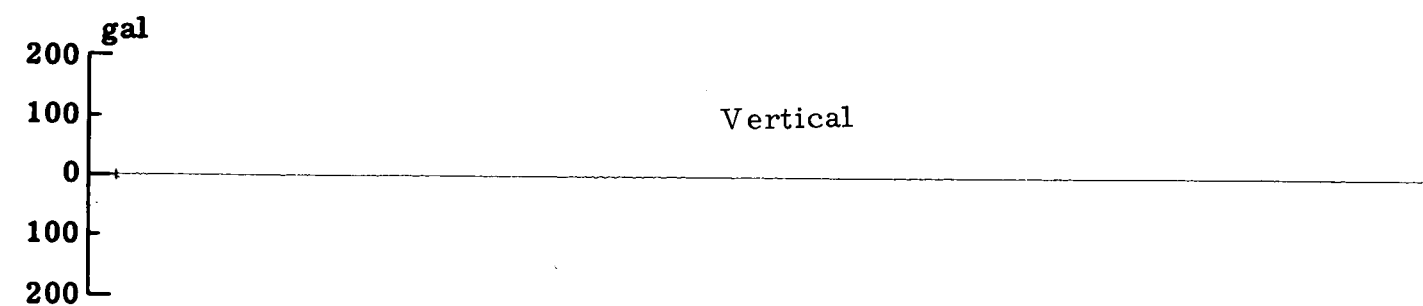
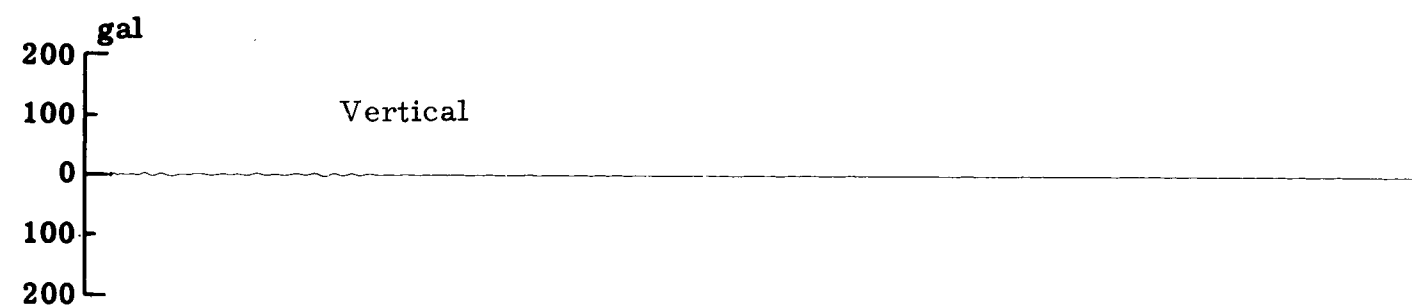
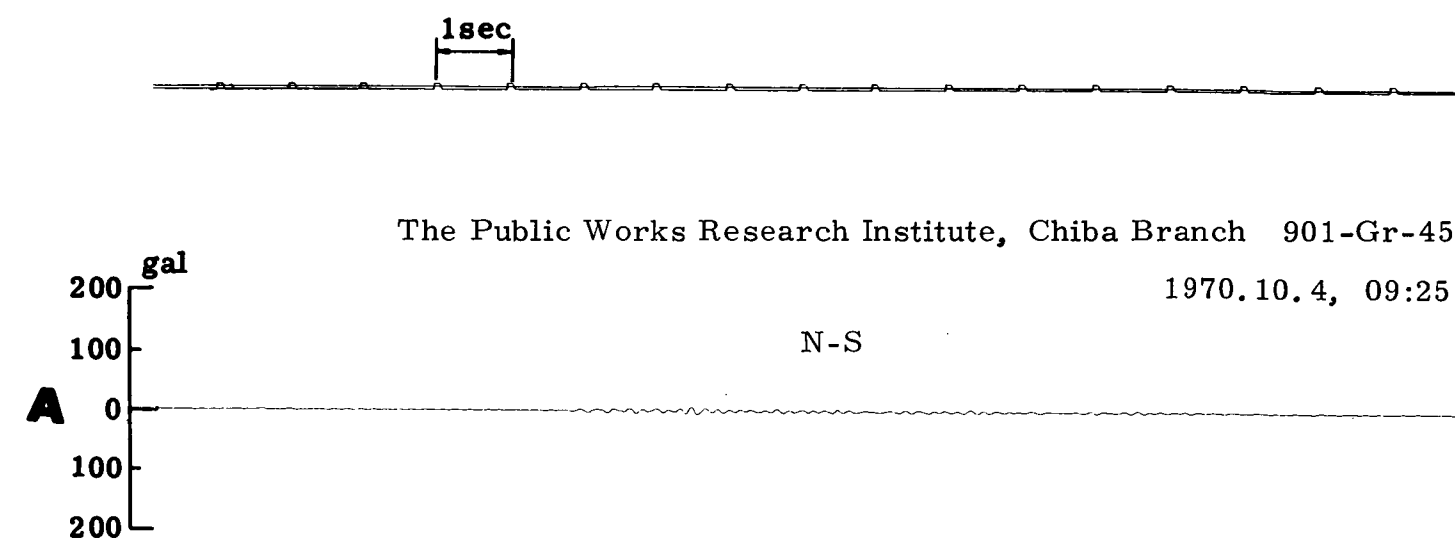
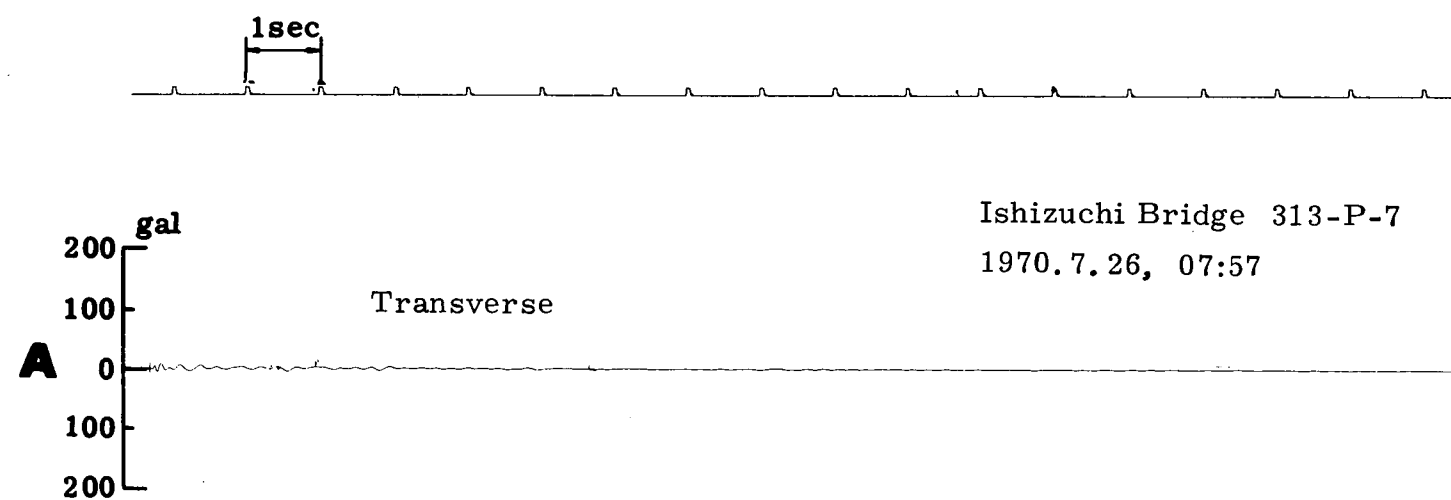
1sec



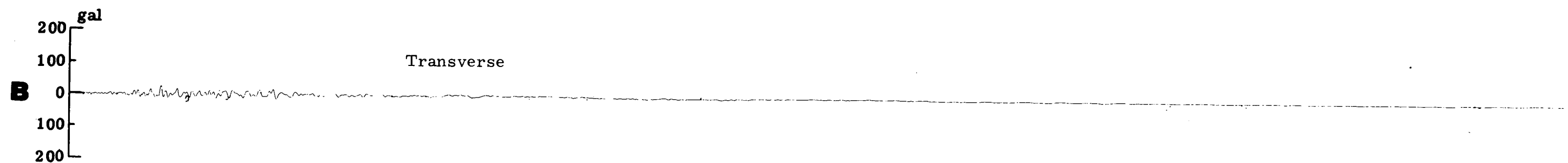
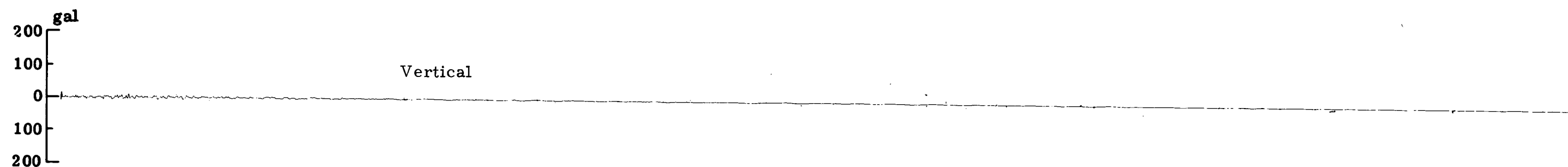
Tokyo Bay (Futtu-Cape) 501-Gr-52

1970.9.30, 04:26





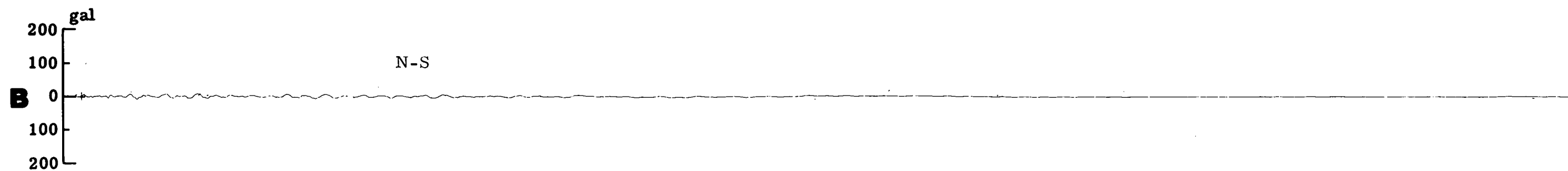
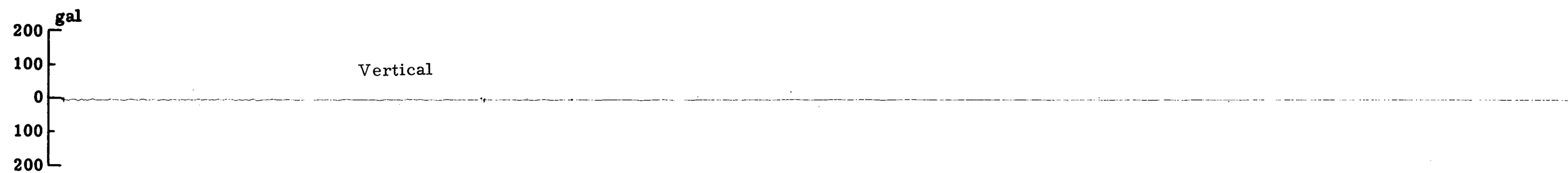
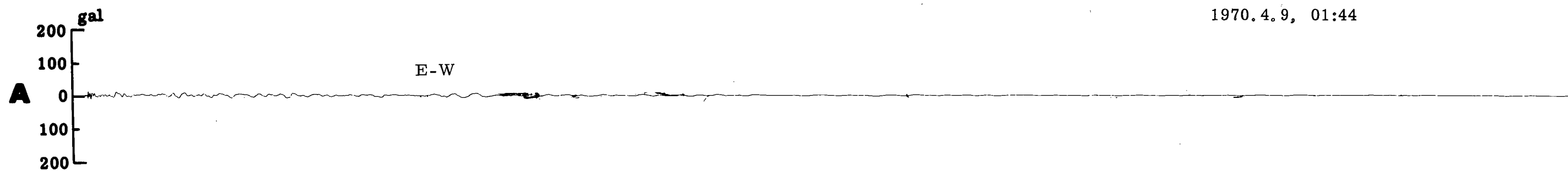
Ochiai Bridge 905-B-266
1970.4.9, 01:44



1sec

Ochiai Bridge 905-C-119

1970.4.9, 01:44



1sec

P.W.R.I. Kashima E.L. 906-Gr-10

1970.2.19, 19:40

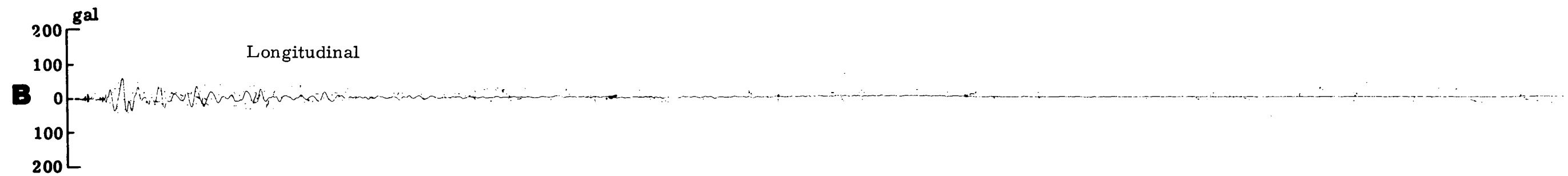
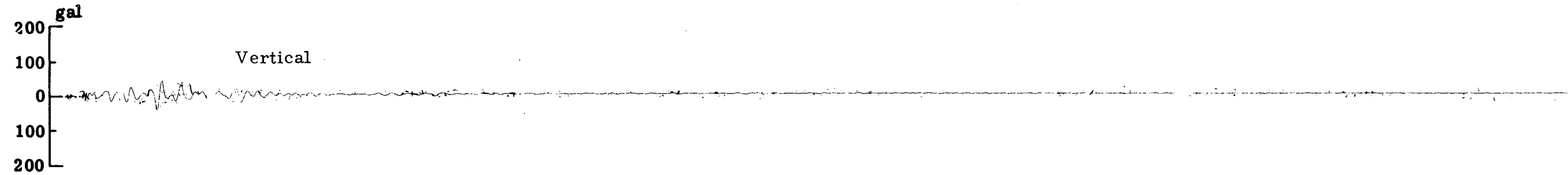
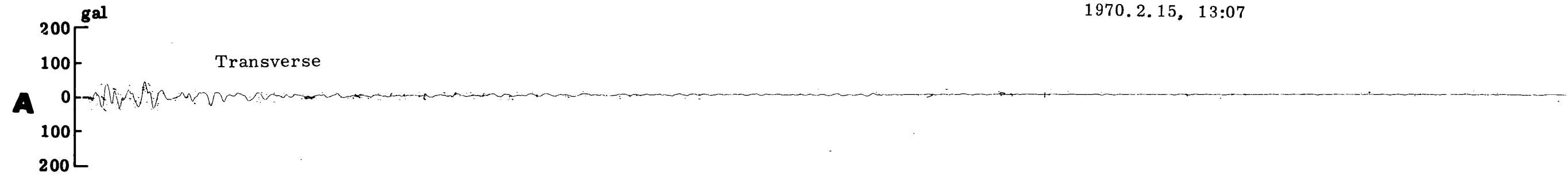
E-W

Vertical

N-S



Taira Bridge 907-Gr-39
1970.2.15, 13:07



1sec

Taira Bridge 907-A-12
1970.2.15, 13:07

gal
200
100
0
100
200

Transverse

gal
200
100
0
100
200

Vertical

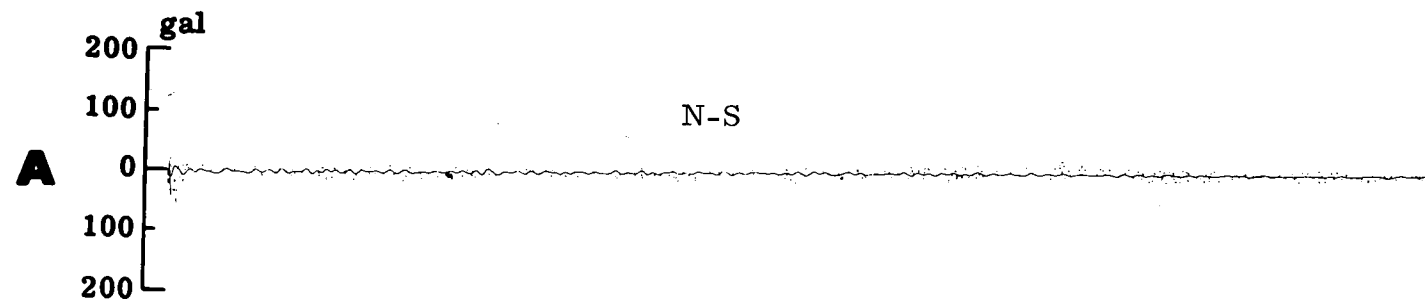
gal
200
100
0
100
200

Longitudinal

B

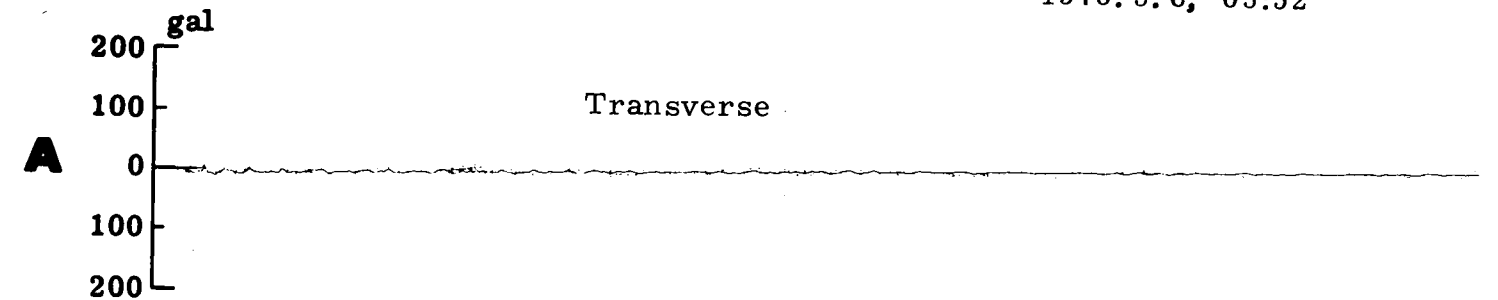
1sec

The Public Works Research Institute, Chiba Branch
901-Gr-144 1970.2.10, 19:40

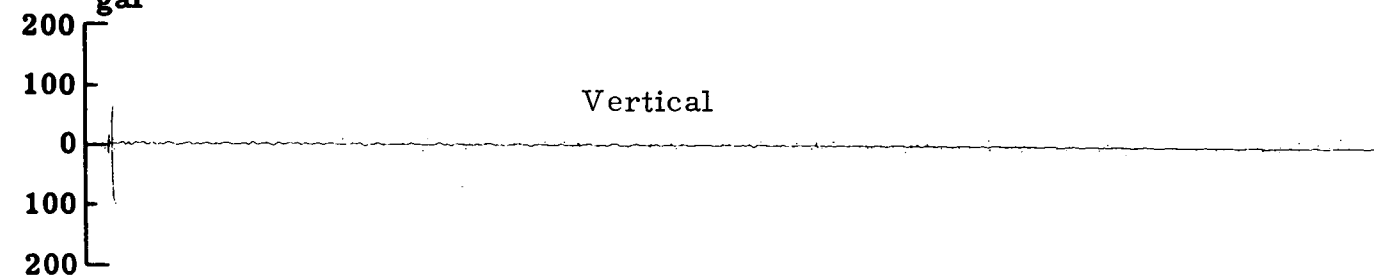


1sec

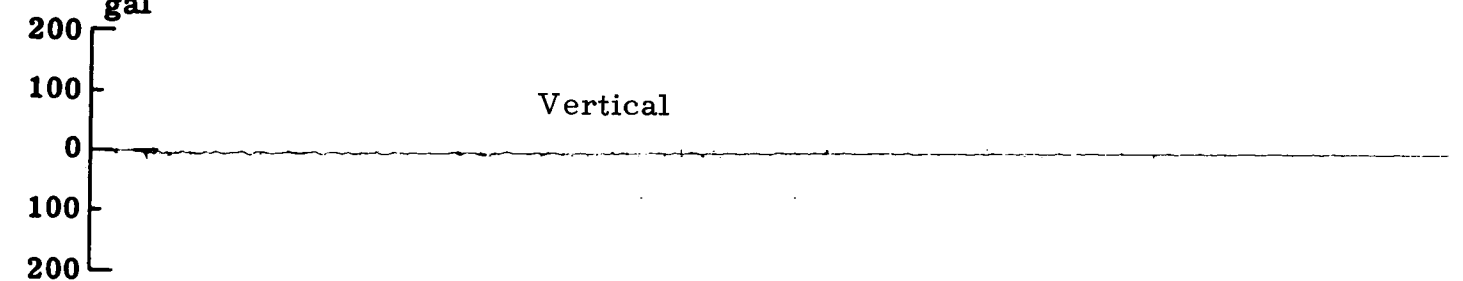
Taira Bridge 907-Gr-40
1970.3.8, 03:52



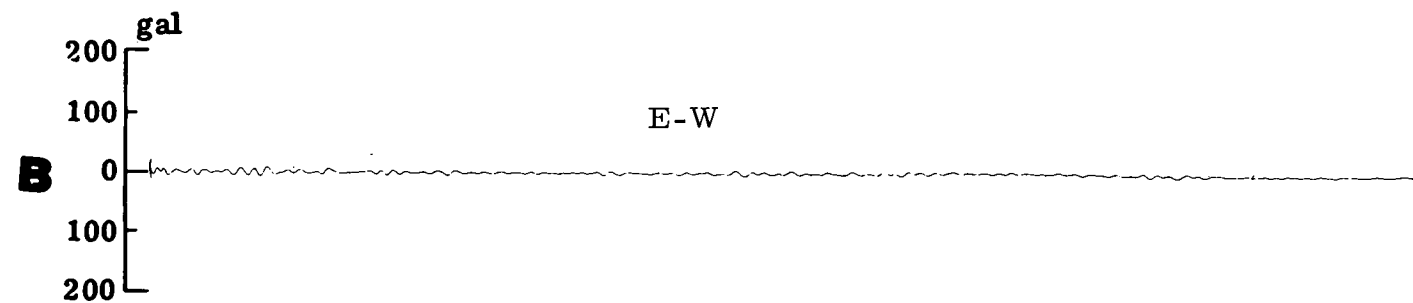
gal



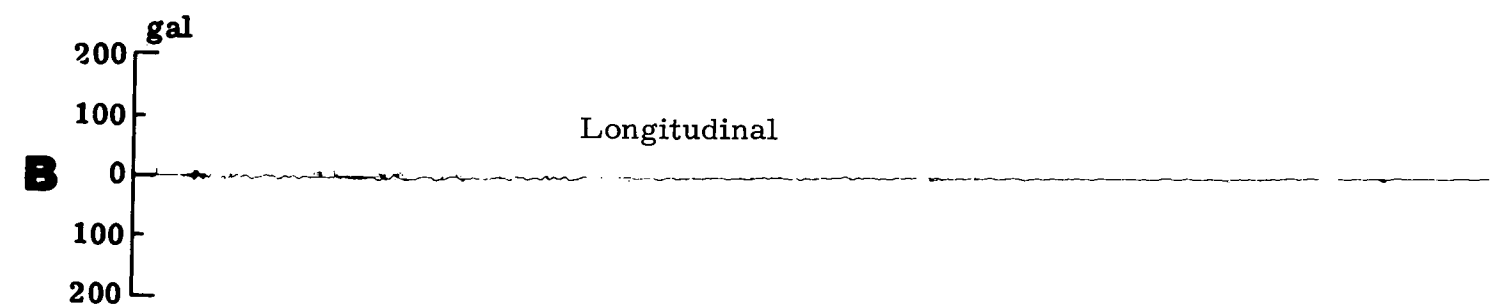
gal



gal

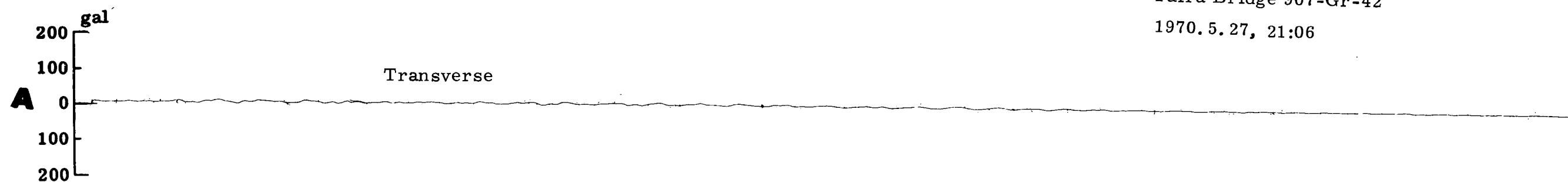


gal



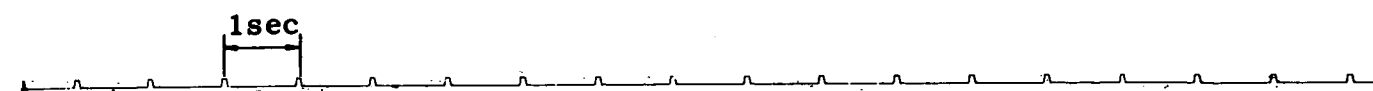
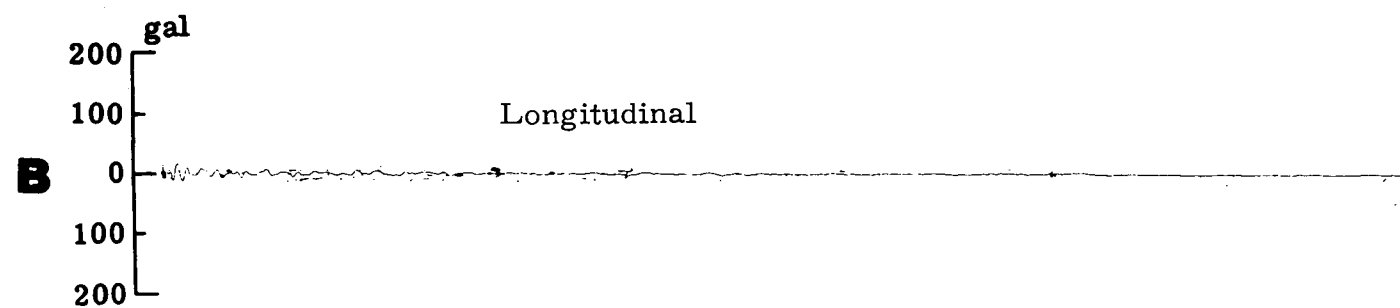
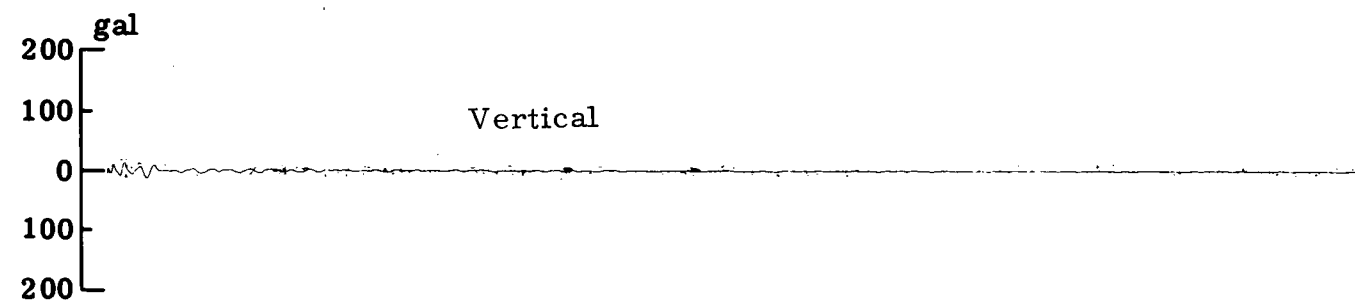
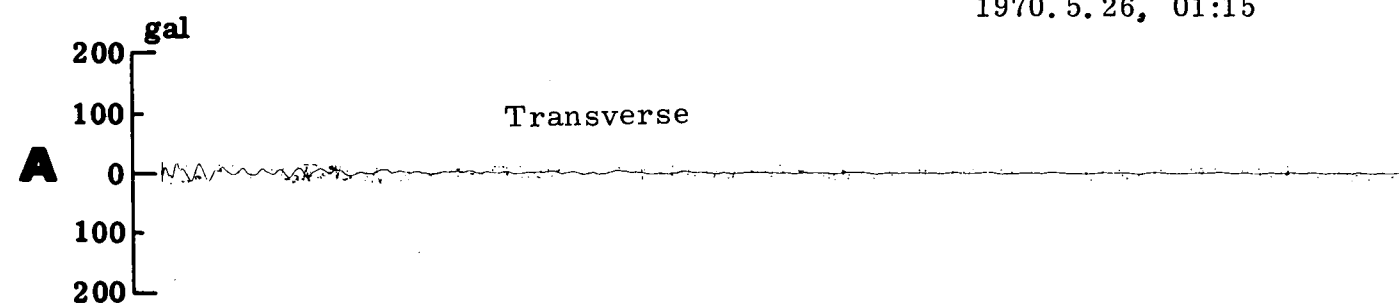
1sec

Taira Bridge 907-Gr-42
1970.5.27, 21:06

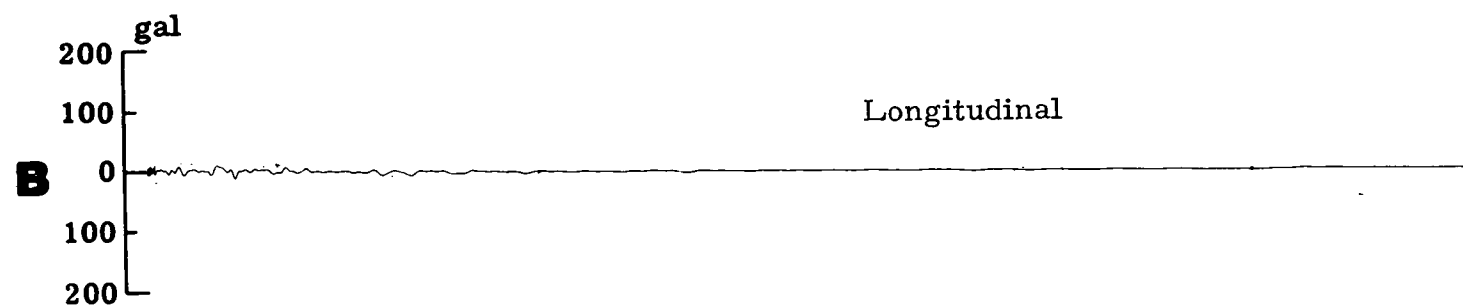
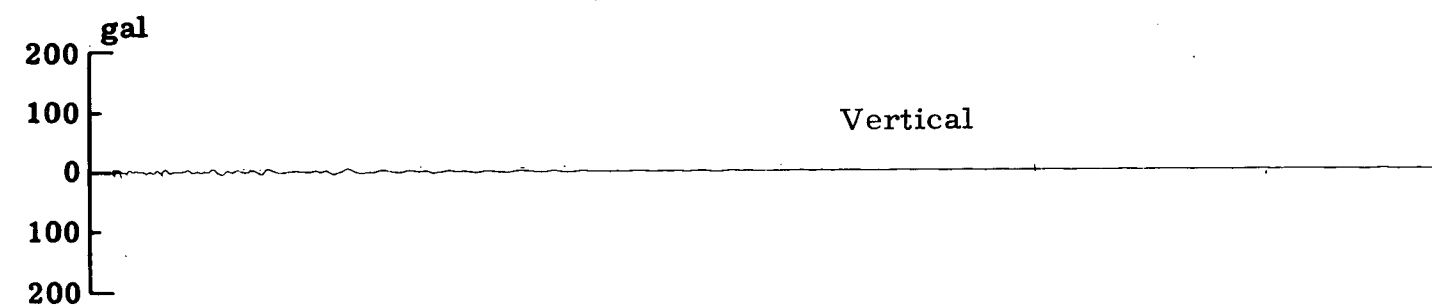
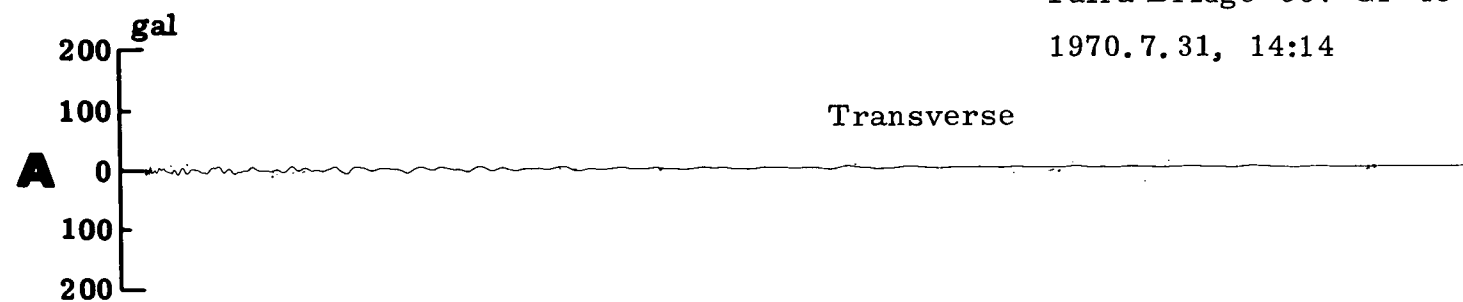




Taira Bridge 907-Gr-41
1970.5.26, 01:15

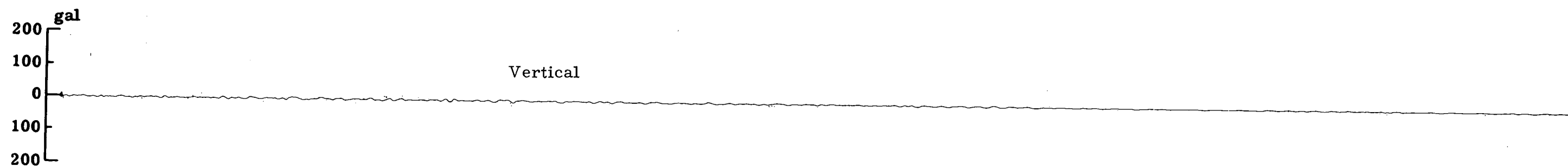
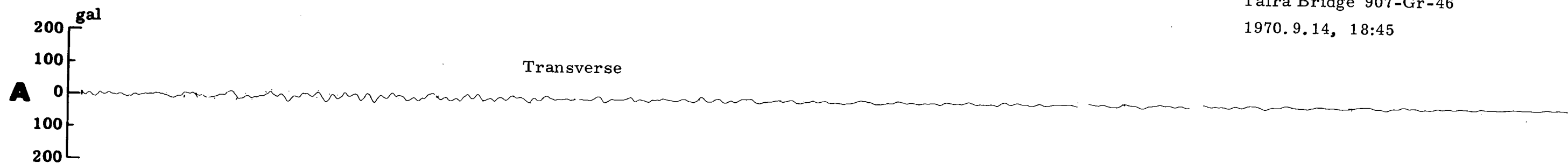


Taira Bridge 907-Gr-45
1970.7.31, 14:14



1sec

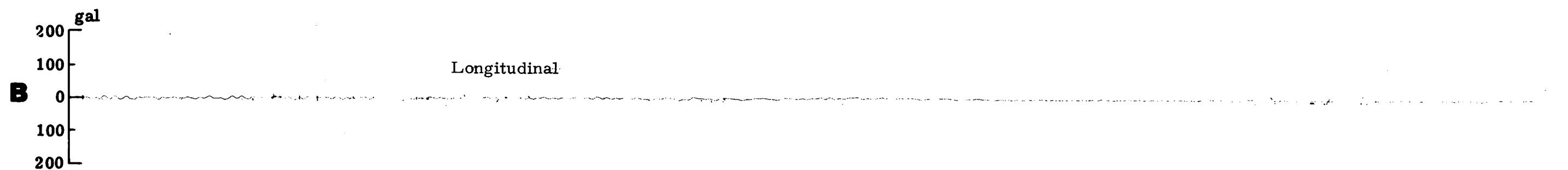
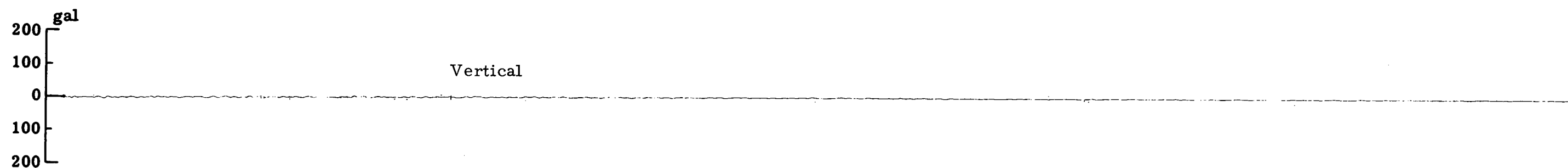
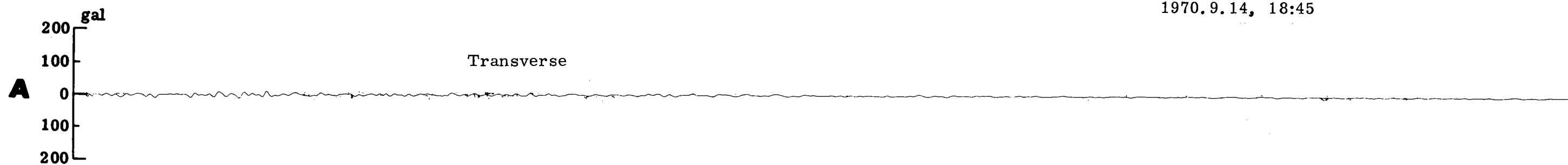
Taira Bridge 907-Gr-46
1970.9.14, 18:45



1sec

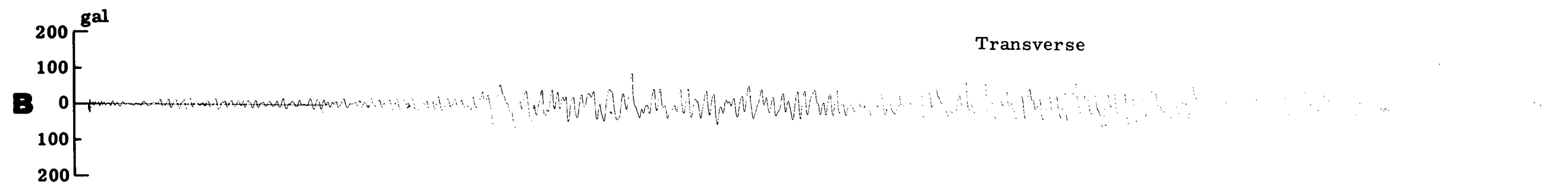
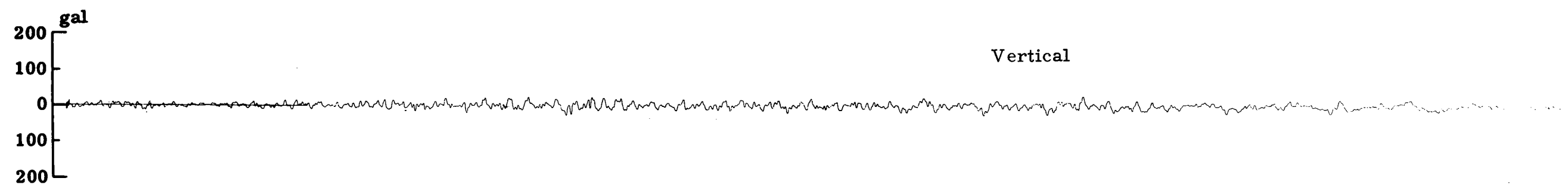
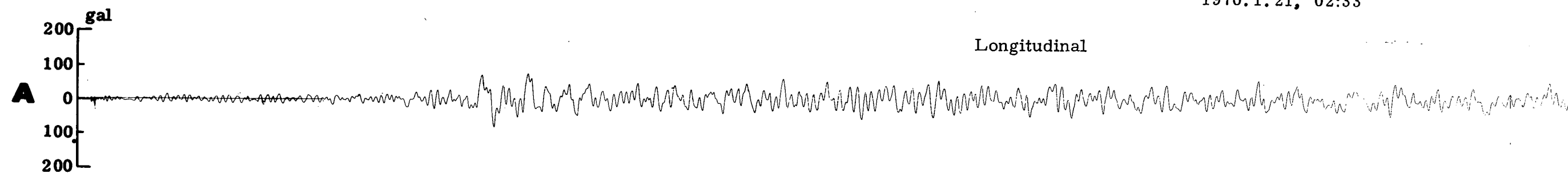
Taira Bridge 907-A-14

1970.9.14, 18:45



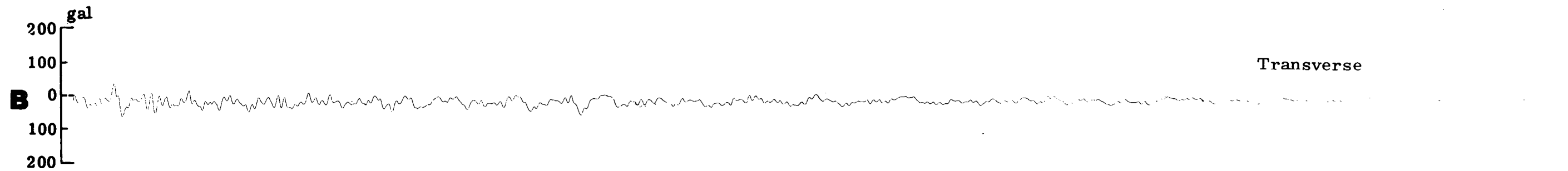
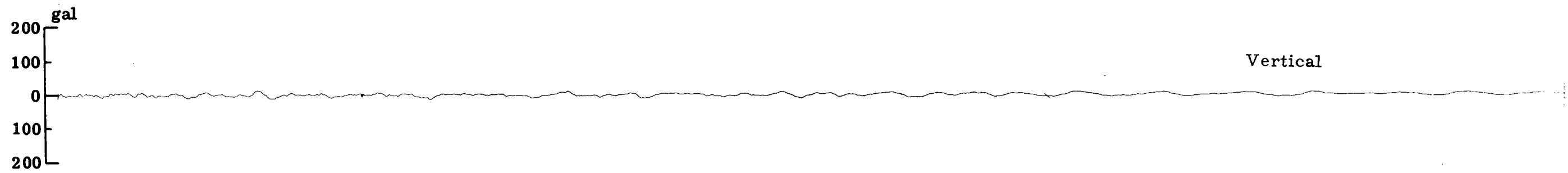
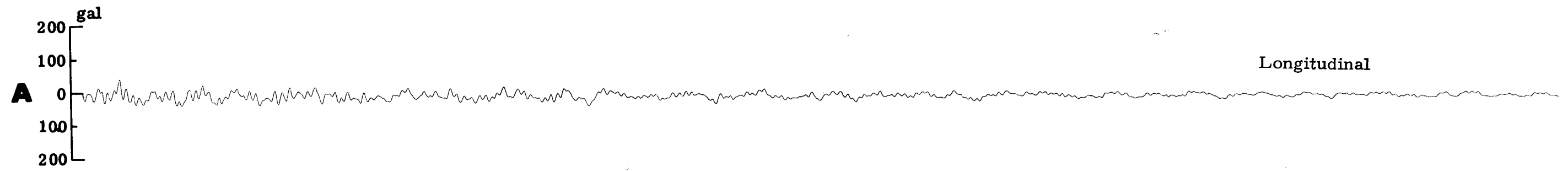
Chiyoda Bridge 1302-Gr-10

1970.1.21, 02:33



1sec

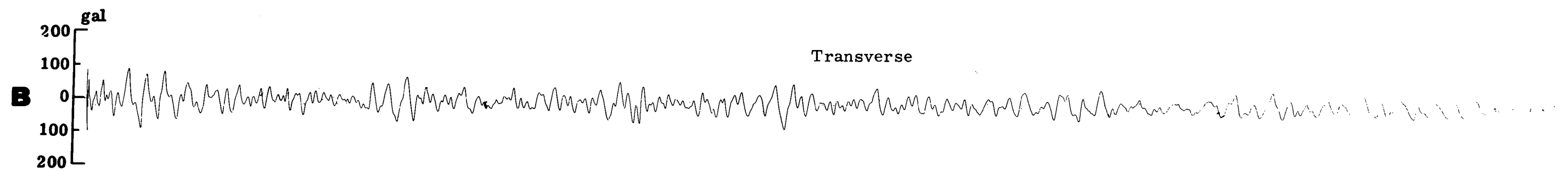
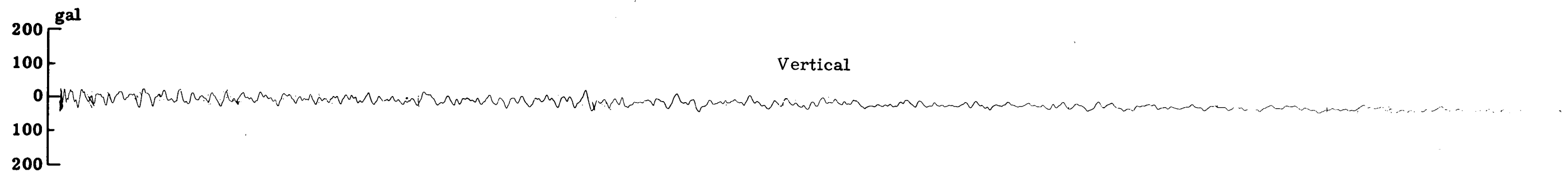
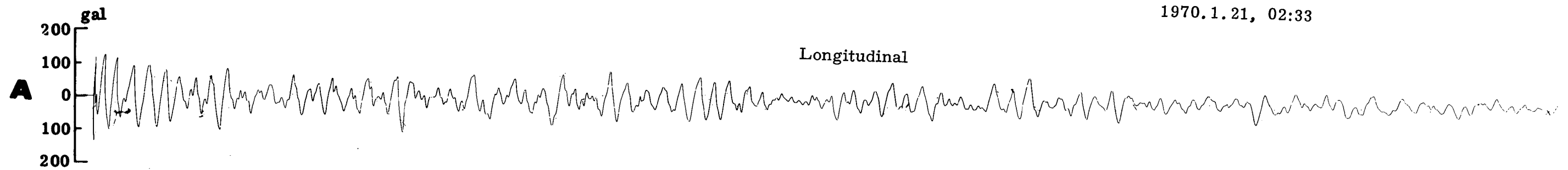
1302-Gr-10 (cont'd)



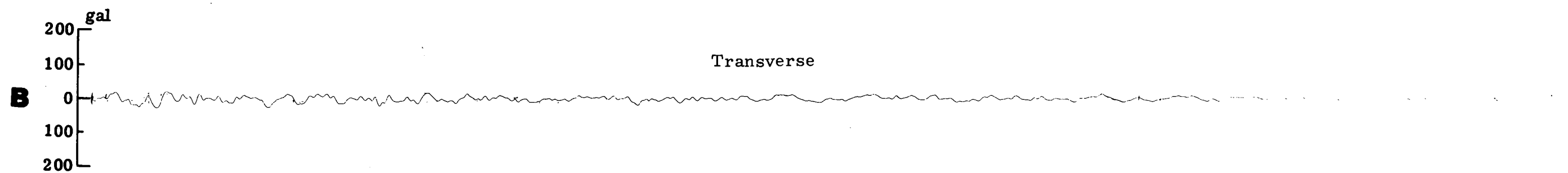
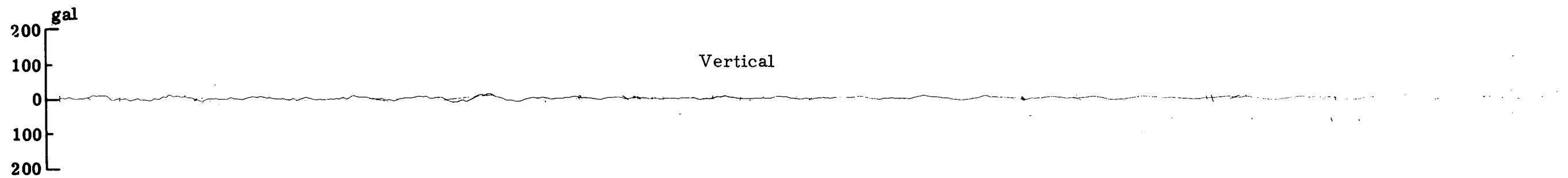
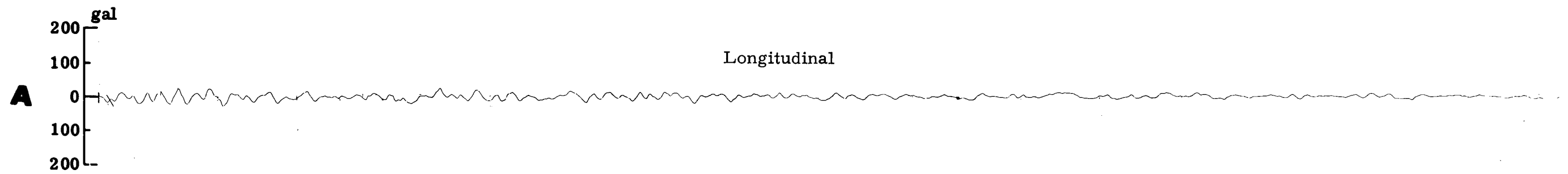
1sec

Chiyda Bridge 1302-P-8

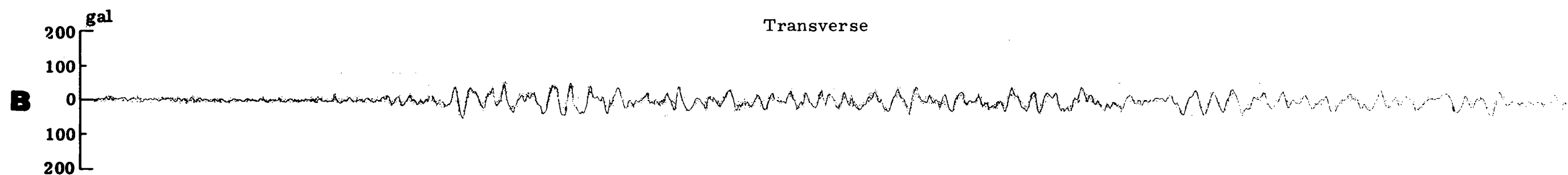
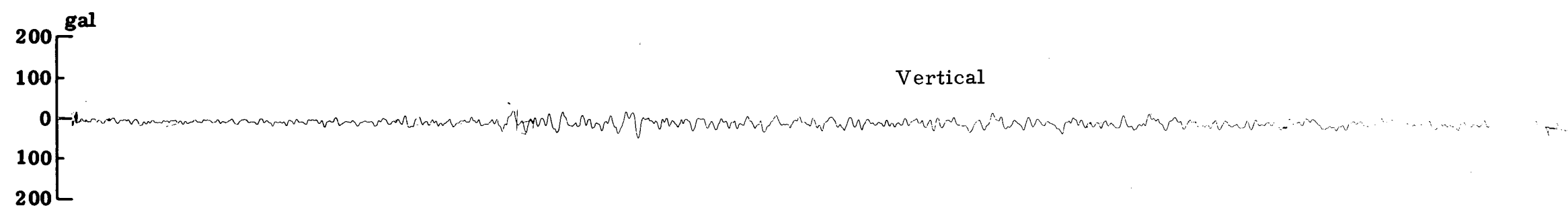
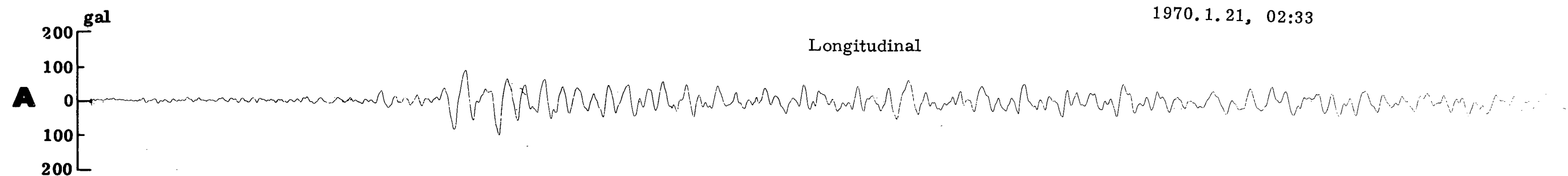
1970.1.21, 02:33



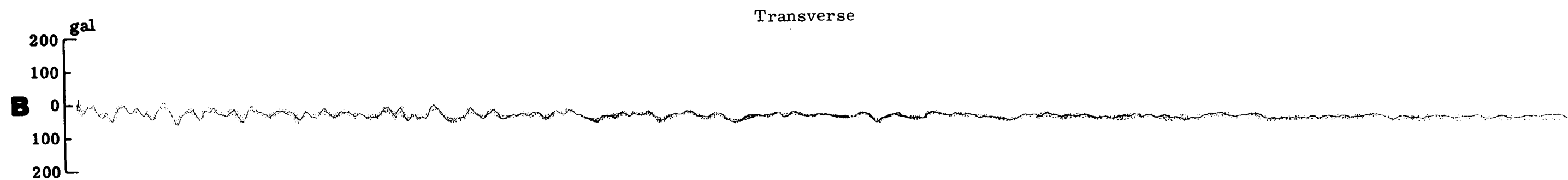
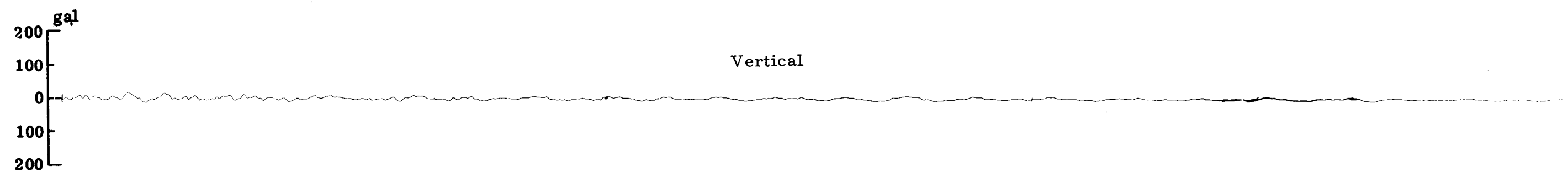
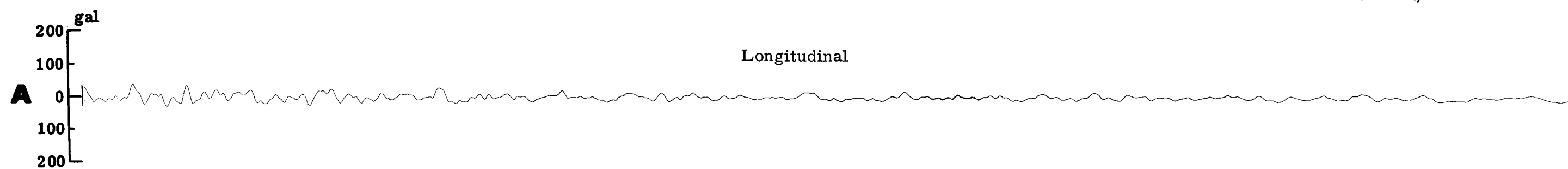
1302-P-8 (cont'd)



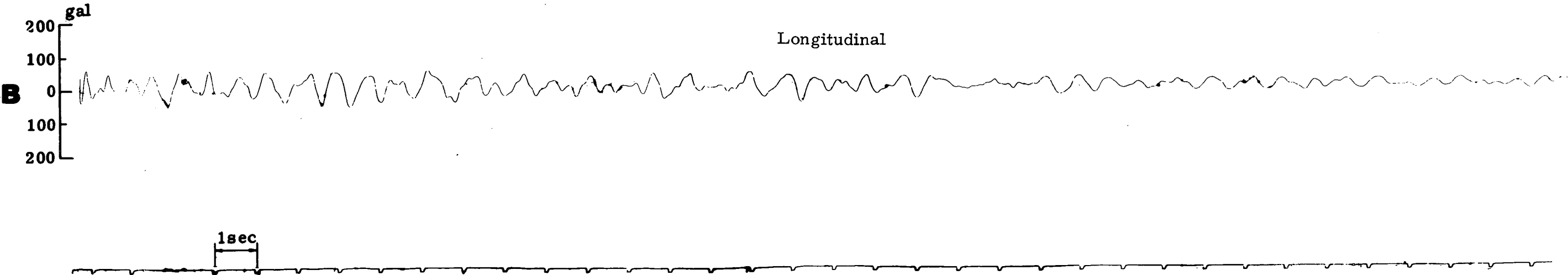
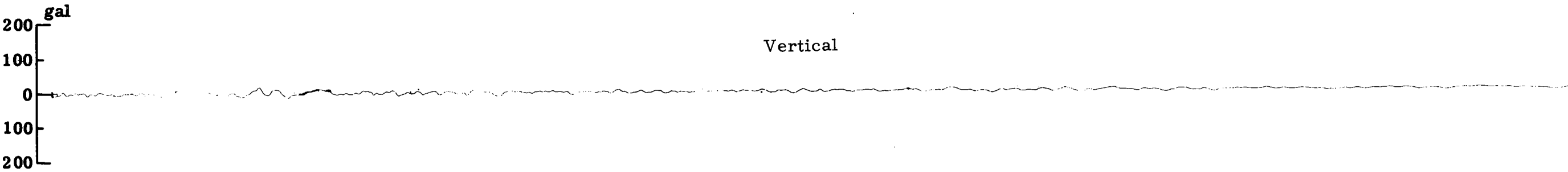
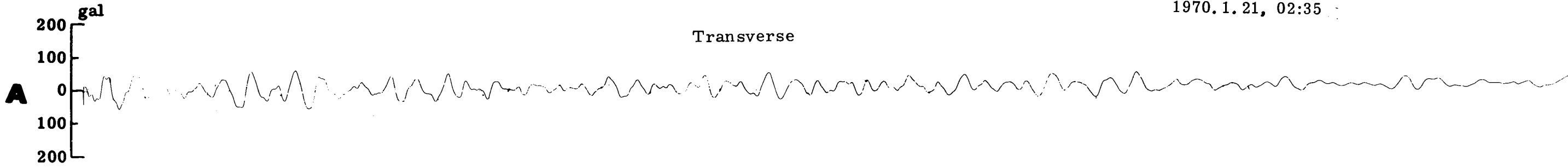
Chiyoda Bridge 1302-A-8
1970.1.21, 02:33



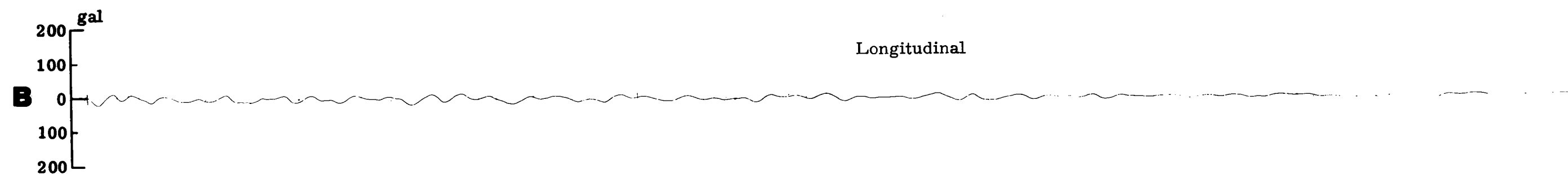
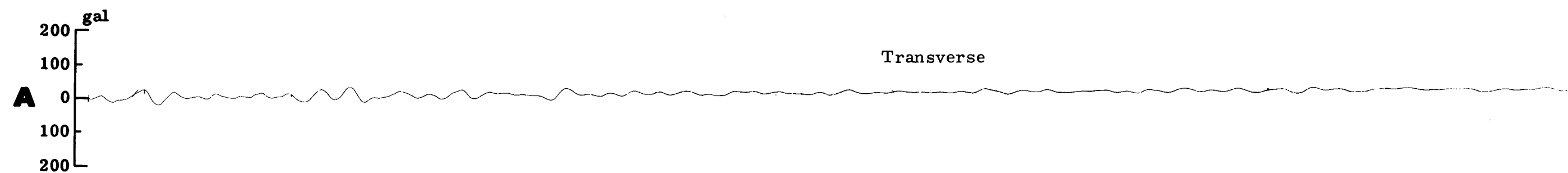
1302-A-8 (cont'd)



Shinishikari Bridge 1303-Gr-5
1970.1.21, 02:35



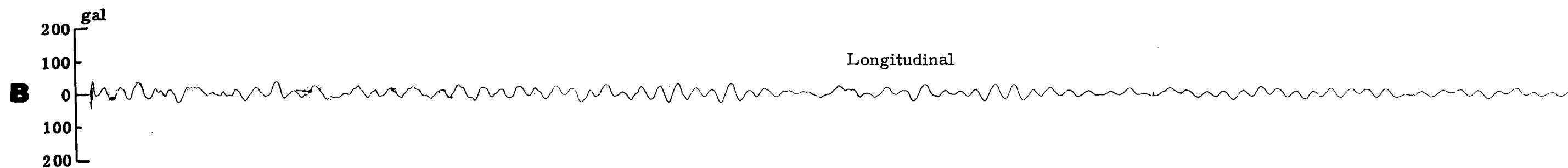
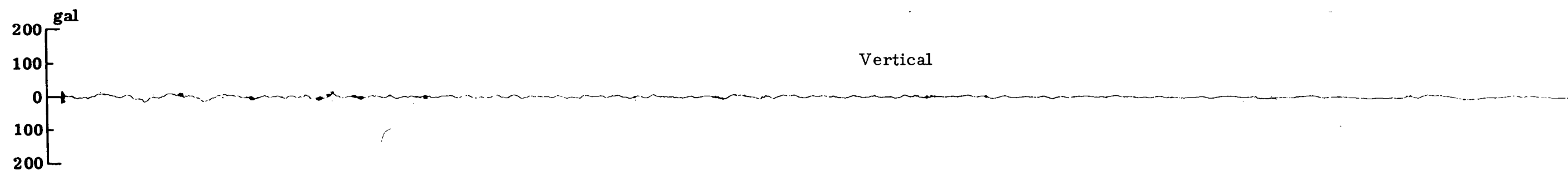
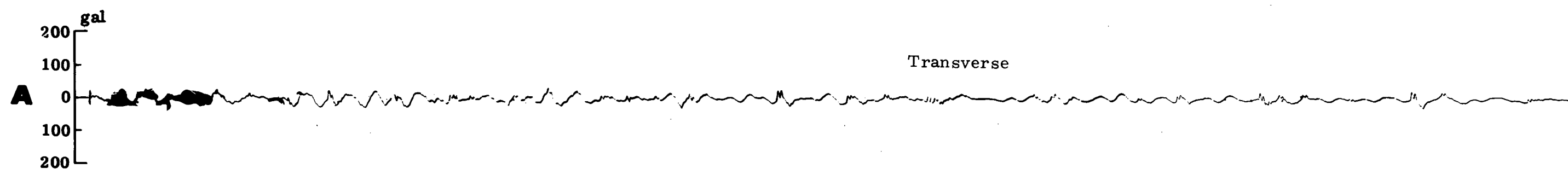
1303-Gr-5 (cont'd)



1sec

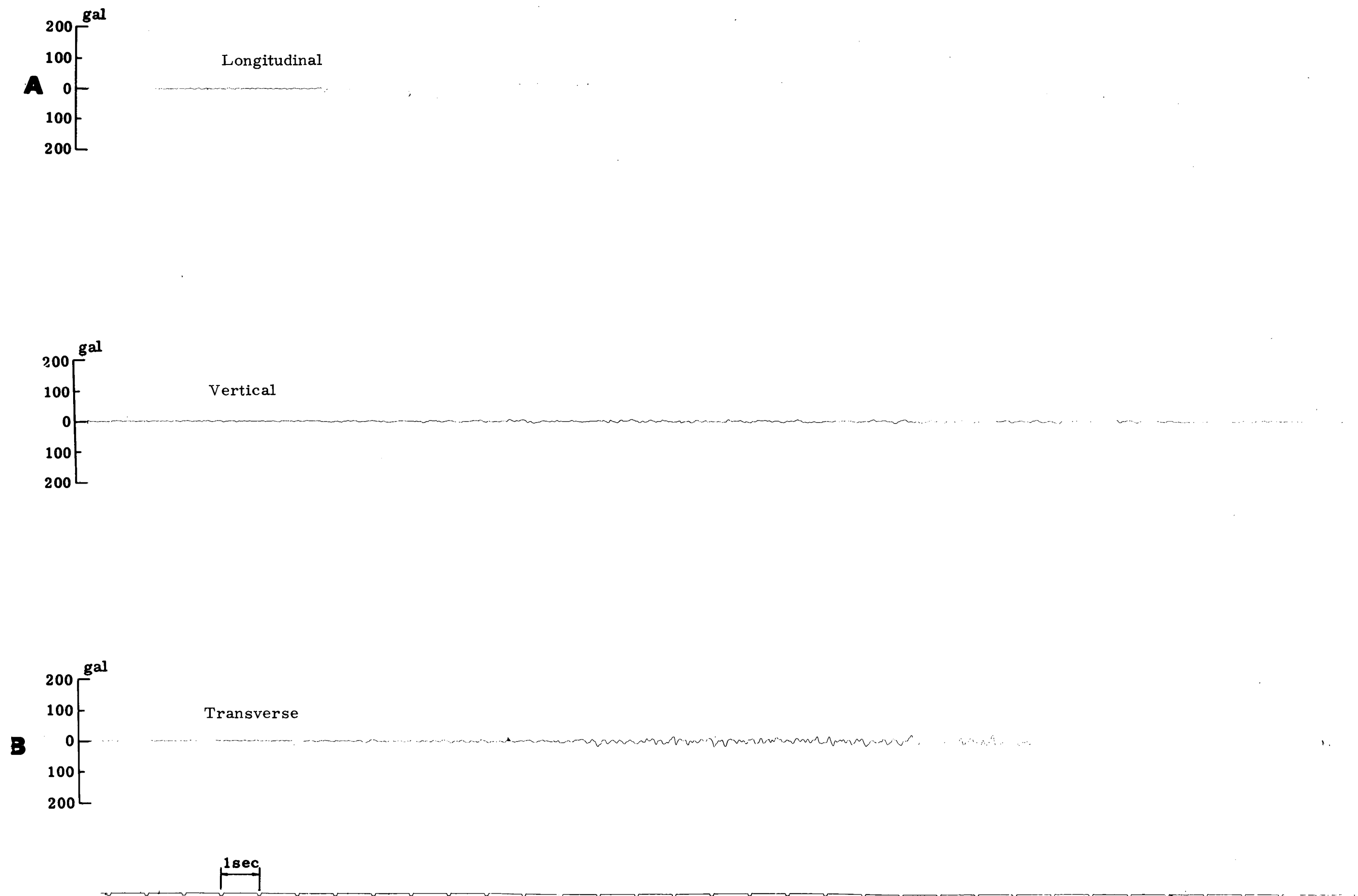
Shinishikari Bridge 1303-P-1

1970.1.21, 02:33



Otanoshike Bridge 1304-Gr-4

1970.1.21, 02:33



1304-Gr-4 (cont'd)

A

200 gal
100
0
100
200

Longitudinal

200 gal
100
0
100
200

Vertical

B

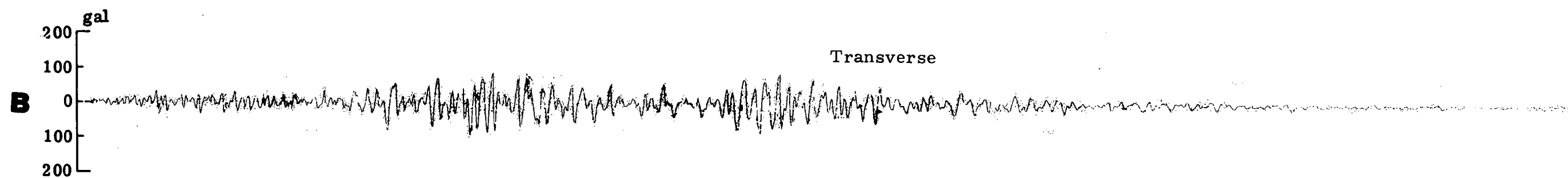
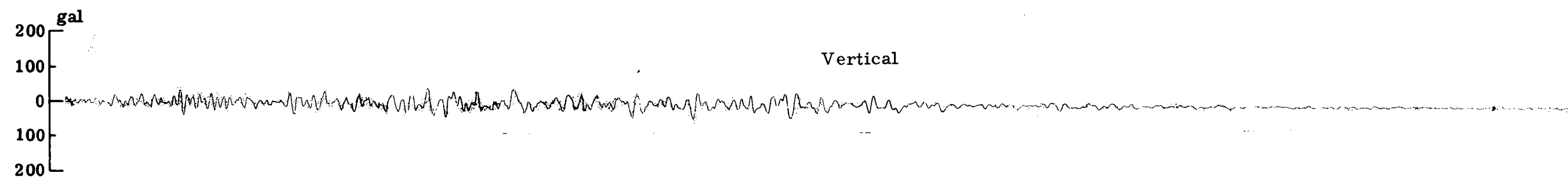
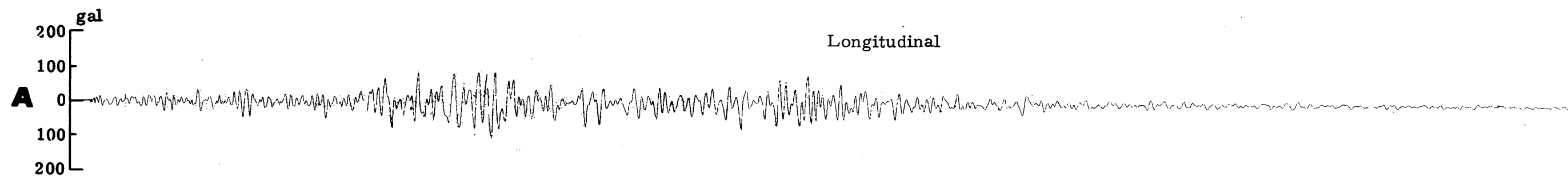
200 gal
100
0
100
200

Transverse

1sec

Horoman Bridge 1305-Gr-11

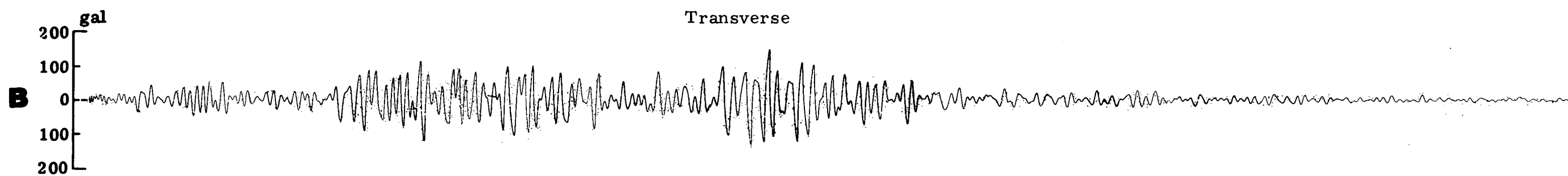
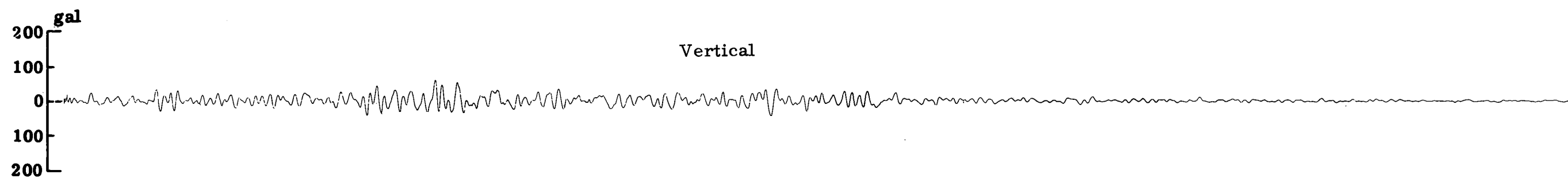
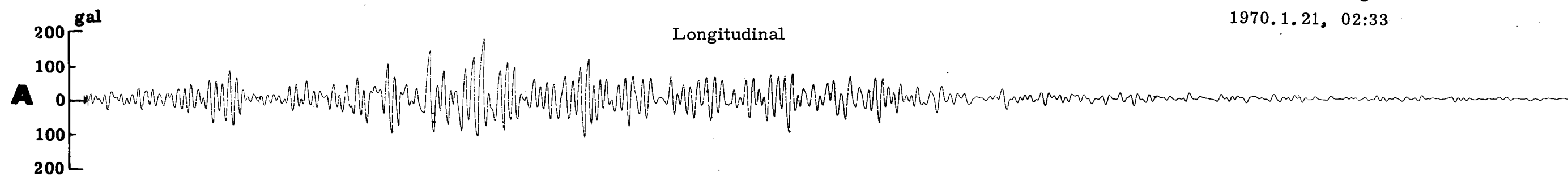
1970.1.21, 02:33



1sec

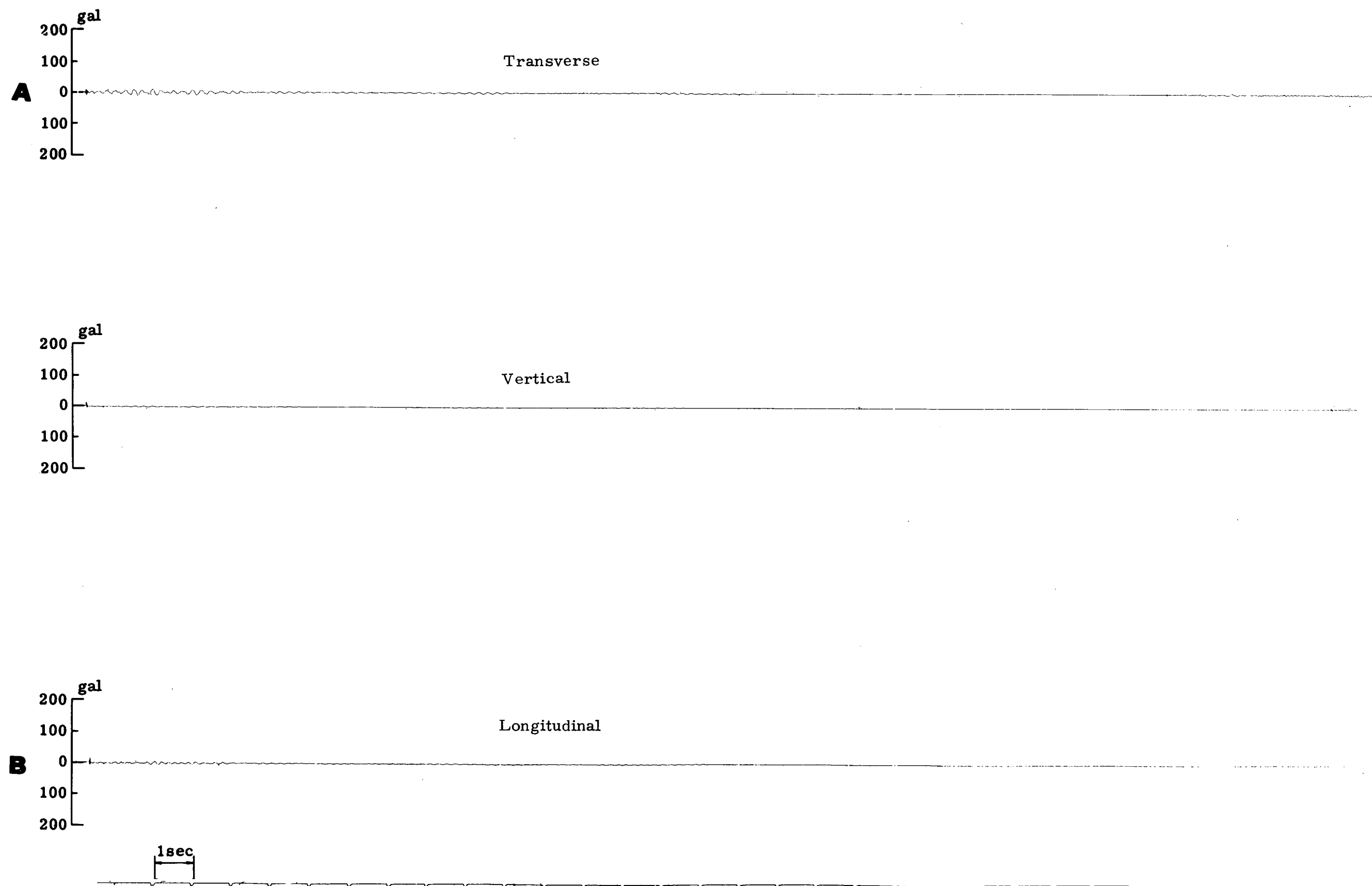
Horoman Bridge 1305-P-5

1970.1.21, 02:33



1sec

Shichiho Bridge 1307-Gr-1
1970.1.21, 02:33



土木構造物における強震記録（１９７０）

土研資料第 718 号
昭 47.3 （１９７２）

栗林 栄一，岩崎 敏男
若林 進，若月 高晴

キーワード：強震記録

要 旨： この報告は，土木構造物およびその近傍地盤に設置した強震計により昭和 45 年 1 月から同年 12 月までの間に得られた記録を原寸大に複写印刷し，各記録の最大値等を表にまとめたものである。



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四丁目十二番五二号
建設省土木研究所
振動研究室
御中

No. _____

No. _____

配布先氏名

配布先住所





土木研究所資料第718号 部

上記のとおり受領しました。

所 属（住所）

氏 名

印

