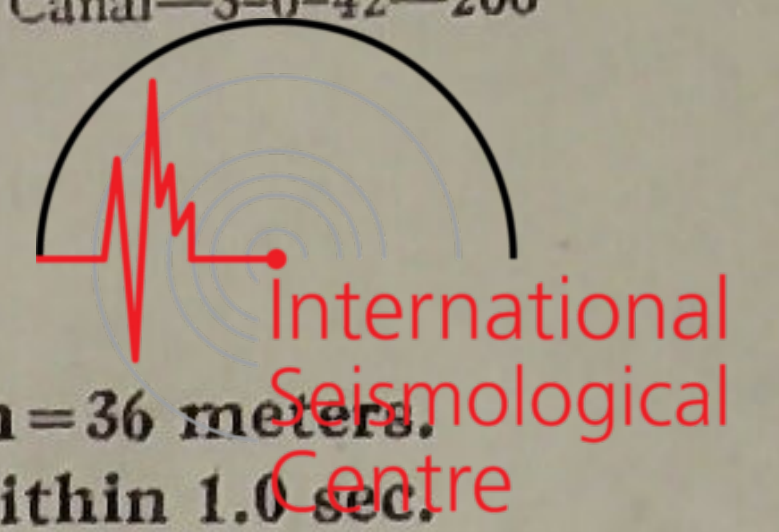


THE PANAMA CANAL
DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF METEOROLOGY AND HYDROGRAPHY



SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

h = 36 meters.

Lithologic foundation: Basalt.

Time Correction: Within 1.0 sec.

INSTRUMENTS—FIXED CONSTANTS

INSTRUMENTS	SYMBOL	REGISTRATION	DAMPING	PAPER SPEED	MASS
Wood-Anderson	I	Photographic	Magnetic	60 mm. per min.	1.3 gr.
Bosch-Omori	II	Smoked Sheet	Air	15 mm. per min.	100 kg.

INSTRUMENTS—DETERMINED CONSTANTS

INSTRUMENTS	COMPONENT	T.	V	h	DETERMINED
Wood-Anderson	N - S	1.0	1370	20 to 1	May 17, 1944
Wood-Anderson	E - W	1.0	1370	19 to 1	May 17, 1944
Bosch-Omori	Not in operation.				
Bosch-Omori	Not in operation.				

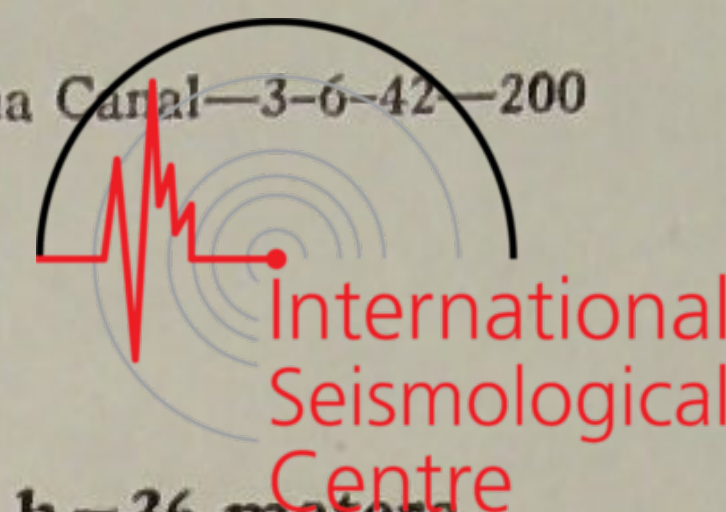
Month January, 1945

Page No. 1

No. and Date	Phase	Time G. M. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s.			
<p>Maximum trace amplitudes are tabulated for each phase whenever the maximum amplitude for either component exceeds 3.0 millimeters. No entry in the amplitude column indicates an amplitude of less than 3.0 millimeters.</p> <p>Approximate distances are given whenever the P and S phases seem clear and distinct. For earthquakes distant less than 300 statute miles local tables are used. For earthquakes distant more than 300 statute miles the 1932 Edition of Jeffreys Tables are used. Whenever the beginning of the P and S phases are indistinct, earthquakes are roughly classified as NEARBY or DISTANT depending upon whether the character of the record indicates an epicenter distant less or more respectively than 300 statute miles.</p> <p>All earthquakes felt in any degree by residents of the Canal Zone are rated on the Modified Mercalli Scale, with quakes reliably reported as felt by any one rated at Intensity I.</p>							
#1 Jan. 11	e F	21:12:35					Nearby.
#2 Jan. 12	e F	3:57:53					Nearby.
#3 Jan. 13	e F	22:25:28					Nearby.
#4 Jan. 14	e F	22:49:22					Nearby.
#5 Jan. 22	e e F	7:50:57 7:53:50 8:57					Distant.
#6 Jan. 31	1P 1S F	19:42:19 19:43:20 19:46			4.0-N 3.6-E		Approximate distance 295 miles.

L. T. CHAPEL, Acting Chief Hydrographer.

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Bosch-Omori	II	Smoked Sheet	Air	15 mm. per min.	100 kg.

INSTRUMENTS—DETERMINED CONSTANTS

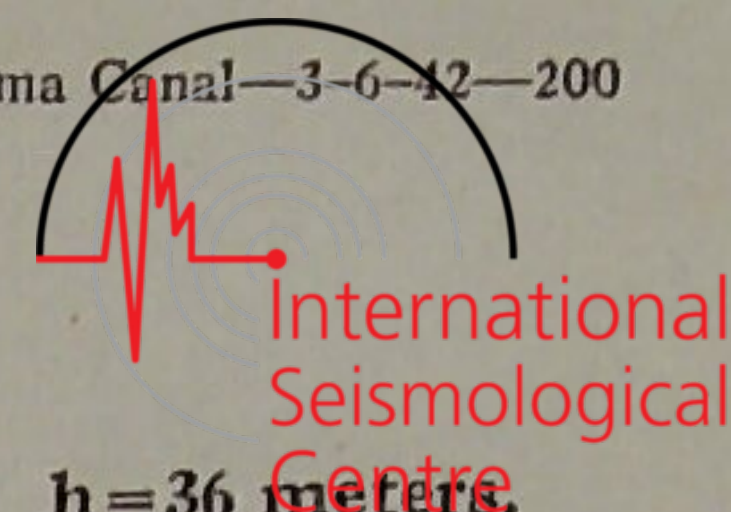
INSTRUMENTS	COMPONENT	T ₀	V	h	DETERMINED	
Wood-Anderson	N-S	1.0	1370	20 to 1	May 17, 1944	
Wood-Anderson	E-W	1.0	1370	19 to 1	May 17, 1944	
Bosch-Omori)	Not	i	n	o	p	
Bosch-Omori)						r

Month February, 1945Page No. 2

No. and Date	Phase	Time G. M. T.			Period	AMPLI- TUDE	REMARKS
		h	m	s			
#7 Feb. 2	eP F	21:40:07 21:46					Distant
#8 Feb. 2	eP eS eL F	23:30:08 23:31:48 23:32:45 23:52					Approximate distance 600 miles
#9 Feb. 6	e F	19:07:59 19:23					Distant
#10 Feb. 10	iP iS F	22:16:27 22:16:38 22:19			11.ON 15.OE		Approximate distance 55 miles
#11 Feb. 12	eP iS F	0:17:53 0:18:36 0:22			3.ON		Approximate distance 205 miles
#12 Feb. 18	iP iS F	6:47:16 6:47:59 7:15			8.ON 7.5E 17.ON 18.OE		Approximate distance 205 miles
#13 Feb. 28	eP iS F	21:37:44 21:38:25 21:43					Approximate distance 195 miles

G. E. MATTHEW
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Lat. 8° 57' 39" N.

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Bosch-Omori	II	Smoked Sheet	Air	15 mm. per min.	100 kg.

INSTRUMENTS—DETERMINED CONSTANTS

INSTRUMENTS	COMPONENT	T.	V	h	DETERMINED
Wood-Anderson	N-S	1.0	1370	20 to 1	May 17, 1944.
Wood-Anderson	E-W	1.0	1370	19 to 1	May 17, 1944.
Bosch-Omori		Not in operation -			
Bosch-Omori		Not in operation -			

Month ~~March~~ 1945

Page No. 3

No. and Date	Phase	Time G. M. T.			Period	AMPLI- TITUDE mm	REMARKS
		h	m	s			
#14 March 17	1P	23	58	34		75.0N 77.0E	Felt by few Approximate distance 140 miles Intensity III
	eS	23	59	03			
	F	00	45				
#15 March 18	eP	00	12	36		3:0N 6:0E	Nearby
	1S	00	13	06			
	F	00	15				
#16 March 18		1	31	41			Nearby
		to	1	34			
#17 March 18	1P	8	10	53		18.0N 25.0E	Approximate distance 140 miles
	1S	8	11	23			
	F	8	20				
#18 March 23	1P	16	29	49		6.0N 5.0E	Approximate distance 145 miles
	1S	16	30	19			
	F	16	33				
#19 March 24	1P	18	35	54		17.5N 27.0E	Approximate distance 145 miles
	1S	18	36	24			
	F	18	44				
#20 March 24	1P	21	44	39			Approximate distance 145 miles
	1S	21	46	09			
	F	21	48				

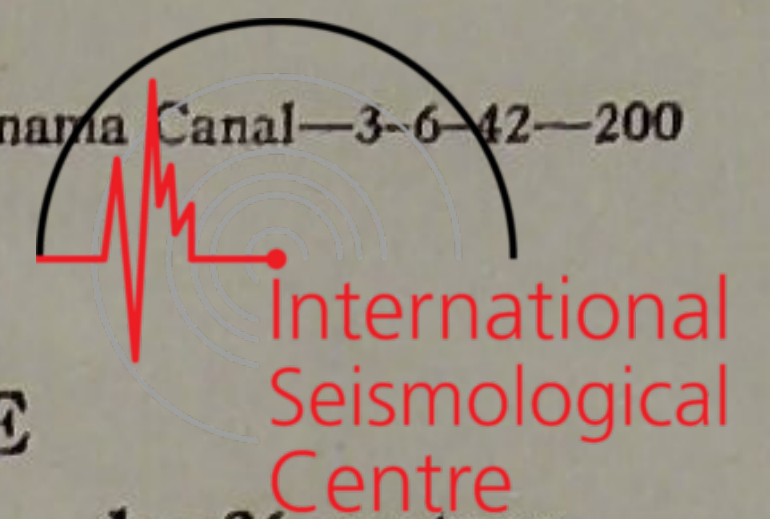
SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month March - 1945Page No. 4

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
#21 March 28	OP IS F	1:58:00 1:58:32 2:01					Approximate distance 155 miles
#22 March 31	● ● F	6:49:37 6:50:07 6:52					Nearby
#23 March 31	● F	7:05 7:10					Nearby
#24 March 31	● ● F	9:50:55 9:51:25 9:54					Nearby

G. E. MATHEW
Chief Hydrographer

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Time Correction: Within 1.0 sec.

INSTRUMENTS—FIXED CONSTANTS

INSTRUMENTS	SYMBOL	REGISTRATION	DAMPING	PAPER SPEED	MASS
Wood-Anderson	I	Photographic	Magnetic	60 mm. per min.	1.3 gr.
Bosch-Omori	II	Smoked Sheet	Air	15 mm. per min.	100 kg.

INSTRUMENTS—DETERMINED CONSTANTS

INSTRUMENTS	COMPONENT	T ₀	V	h	DETERMINED
Wood-Anderson	N-S	1.0	1370	20 to 1	May 17, 1944
Wood-Anderson	E-W	1.0	1370	19 to 1	May 17, 1944
Bosch-Omori					
Bosch-Omori	Not in operation.				

Month April - 1945Page No. 5

No. and Date	Phase	Time G. M. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
#25 April 3	1P 1S F	9:40:20 9:40:37 9:42					Approximate distance 75 miles
#26 April 6	oP 1S F	18:32:42 18:34:05 18:47			3.2N 5.8E		Approximate distance 500 miles
#27 April 6	o F	18:48:42 18:51					Nearby
#28 April 7	oP 1S F	10:27:16 10:28:39 10:37					Approximate distance 500 miles
#29 April 9	oP oS F	20:12:25 20:13:00 20:19			4.0N 5.0E		Approximate distance 170 miles
#30 April 14	oP 1S	2:39:09 2:39:57 2:47			8.5N 7.0E		Approximate distance 230 miles
#31 April 21	oP SP F	12:55:34 12:56:14 13:10			11.0N 20.0E		Approximate distance 190 miles
#32 April 21	o F	17:19:24 17:28					Distant
#33 April 28	1P oP F	15:45:24 15:46:23 15:55					Approximate distance 285 miles

SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month April - 1945Page No. 6

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
#34 April 28	eP F	21:29:04 21:32				Nearby	
#35 April 29	eP eS F	19:03:32 19:04:03 19:06		3.5N 4.0E		Approximate distance 150 miles	
#36 April 29	e-P F	20:19:56 20:28				Distant	
#37 April 29	eP F	21:02:04 21:09				Nearby	

G. E. MATTHEW
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Lithologic foundation: Basalt.

Time Correction: Within 1.0 sec.

INSTRUMENTS—FIXED CONSTANTS

INSTRUMENTS	SYMBOL	REGISTRATION	DAMPING	PAPER SPEED	MASS
Wood-Anderson	I	Photographic	Magnetic	60 mm. per min.	1.3 gr.
Bosch-Omori	II	Smoked Sheet	Air	15 mm. per min.	100 kg.

INSTRUMENTS—DETERMINED CONSTANTS

INSTRUMENTS	COMPONENT	T.	V	h	DETERMINED
Wood-Anderson	N - S	1.0	1370	20 to 1	May 17, 1944
Wood-Anderson	E - W	1.0	1370	19 to 1	May 17, 1944
Bosch-Omori)	Not in operation				
Bosch-Omori)					

Month May - 1945.Page No. 7

No. and Date	Phase	Time G. M. T.			Period	AMPLI- TUDE	REMARKS
		h	m	s			
#38 May - 9	eP F	9:31:48 9:36				Nearby	
#39 May 10	e F	17:58:30 18:17				Distant	
#40 May 14	eP IS F	8:24:16 8:24:28 8:27			7.5N 5.0E	Approximate distance 55 miles.	
#41 May 14	eP F	16:16:46 16:21				Nearby	
#42 May 19	e F	8:00:16 8:50				Distant	
#43 May 26	iP IS F	8:25:56 8:26:17 8:28			2.0N 4.0E	Approximate distance 95 miles.	

Both Wood-Anderson Seismographs were readjusted on May 28, 1945 and constants were determined as follows:

N-S component, period 1.0 second, magnification 1370, damping ratio 20 to 1.
E-W component, period 1.0 second, magnification 1370, damping ratio 20 to 1.

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INSTRUMENTS	SYMBOL	REGISTRATION	DAMPING	PAPER SPEED	MASS
Wood-Anderson	I	Photographic	Magnetic	60 mm. per min.	1.3 gr.
Bosch-Omori	II	Smoked Sheet	Air	15 mm. per min.	100 kg.

INSTRUMENTS—DETERMINED CONSTANTS

INSTRUMENTS	COMPONENT	T ₀	V	h	DETERMINED
Wood-Anderson	N - S	1.0	1370	20 to 1	May 28, 1945
Wood-Anderson	E - W	1.0	1370	20 to 1	May 28, 1945
Bosch-Omori) Not in operation.				
Bosch-Omori					

Month June, 1945

Page No. 7

No. and Date	Phase	Time G. M. T.			Period	AMPLITUDE	REMARKS
		h	m	s			
44 3	1P	13:06:27				36.0N 39.0E 48.0N 49.0E	Approximate distance 215 miles. Intensity IV. Felt by many in Canal Zone; some were awakened from sleep. Generally felt in Province of Chiriqui, Republic of Panama, with minor damage at David and Puerto Armuelles. U. S. Coast & Geodetic survey locates epicenter at a point close offshore the Pacific coast of Panama midway between David and Puerto Armuelles.
	1S	13:07:13					
	F	13:45					
45 3	1P	13:19:13				5.0N 3.5E	After shock of #44. Approximate distance 205 miles.
	1S	13:19:56					
	F	13:22					
46 3	•	14:03:33					Minor aftershock of # 44. Nearby.
47 3	•P	16:05:19					Aftershock of # 44. Approximate distance 210 miles.
	•S	16:06:03					
	F	16:08					
48 3	1P	16:57:52				9.0N 8.5E	Aftershock of # 44. Approximate distance 220 miles. Intensity I. Felt by a few residents of the Canal zone.
	1S	16:58:38					
	F	17:05					
49 3	•P	21:39:41					Aftershock of # 44. Approximate distance 185 miles.
	•S	21:40:20					
	F	21:43					
50 4	•	0:42:47					Minor aftershock of # 44. Nearby.
51 4	•	1:38:21					Minor aftershock of # 44. Nearby.

SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month June, 1945

Page No. 8

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
52 4	OP IS F	4:58:37 4:59:19 5:04					Aftershock of # 44. Approximate distance 200 miles.
53 4	•	10:12:00					Minor aftershock of # 44. Nearby.
54 4	OP OS F	15:54:27 15:55:15 ----			3.0N 4.0E 14.0N 14.0E		Aftershock of # 44. Approximate distance 230 miles. Record obscured by beginning of # 55.
55 4	OP OS F	16:04:22 16:05:14 ----					Aftershock of # 44. Approximate distance 250 miles. Record obscured by beginning of # 56.
56 4	•	16:09:38					Minor aftershock of # 44. Nearby.
57 4	•	16:20:45					Minor aftershock of # 44. Nearby.
58 4	•	17:18:42					Minor aftershock of # 44. Nearby.
59 4	•	17:39:53					Minor aftershock of # 44. Nearby.
60 4	•	19:54					Minor aftershock of # 44. Nearby.
61 4	•	21:16					Minor aftershock of # 44. Nearby.
62 4	•	23:22					Minor aftershock of # 44. Nearby.
63 4	•	23:29					Minor aftershock of # 44. Nearby.
64 5	•	0:08					Minor aftershock of # 44. Nearby.
65 5	OP IS F	4:45:47 4:46:25 4:50			5.0N 6.5E		Aftershock of # 44. Approximate distance 180 miles.
66 5	OP IS F	8:38:08 8:38:47 8:41					Aftershock of # 44. Approximate distance 185 miles.
67 5	OP IS F	9:54:06 9:54:47 9:58					Aftershock of # 44. Approximate distance 200 miles.

SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month June, 1945Page No. 9

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
68	5	•	10:12			Minor aftershock of # 44. Nearby.	
69	5	•	14:41:39			Minor aftershock of # 44. Nearby.	
70	5	•	17:02			Minor aftershock of # 44. Nearby.	
71	5	•	21:33			Minor aftershock of # 44. Nearby.	
72	5	eP eS F	21:54:34 21:55:21 22:02		2.5M 3.5E	Aftershock of # 44. Approximate distance 225 miles.	
73	6	•	1:30:39			Minor aftershock of # 44. Nearby.	
74	6	•	2:20			Minor aftershock of # 44. Nearby.	
75	6	•	2:42:34			Minor aftershock of # 44. Nearby.	
76	6	1P 1S F	7:45:25 7:46:12 7:52		2.5M 5.0E	Aftershock of # 44. Approximate distance 225 miles.	
77	6	eP 1S F	22:14:16 22:14:57 22:18			Aftershock of # 44. Approximate distance 200 miles.	
78	7	eP eS F	1:17:00 1:17:38 1:24		4.5M 6.0E	Aftershock of # 44. Approximate distance 180 miles.	
79	7	eP eS F	1:45:30 1:46:16 1:51			Aftershock of # 44. Approximate distance 220 miles.	
80	7	•	1:56:17			Minor aftershock of # 44. Nearby.	
81	7	•	2:28:25			Minor aftershock of # 44. Nearby.	
82	7	•	3:06:33			Minor aftershock of # 44. Nearby.	
83	7	•	11:58:48			Minor aftershock of # 44. Nearby.	

SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Page No. 10

Month _____

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
84 9	eP 1S F	3:26:54 3:27:39 3:34					Approximate distance 215 miles.
85 11	eP 1S F	10:31:07 10:31:52 10:35					Approximate distance 215 miles.
86 12	•	3:44:26					Minor shock. Nearby.
87 12	•	13:21:11					Minor shock. Nearby.
88 12	•	17:17:35					Minor shock. Nearby.
89 13	•	4:25:00					Minor shock. Nearby.
90 13	1P 1S F	14:06:50 14:07:36 14:18			3.1 N 3.5 E 17.0 N 22.0 E		Approximate distance 235 miles. Reported felt by residents of David, Province of Chiriqui, Republic of Panama.
91 18	eP 1S F	6:56:16 6:56:54 7:00					Approximate distance 180 miles.
92 24	1P 1S F	1:04:22 1:05:04 1:10			7.0 N 7.0 E		Approximate distance 200 miles.
93 24	•	8:31:11					Minor shock. Nearby.
94 25	•	9:28:31					Minor shock. Nearby.
95 26	•	9:38:25					Minor shock. Nearby.
96 26	• • F	21:26:40 21:27:38 21:34					Nearby.
97 28	• • F	17:15:39 17:16:23 17:19					Nearby.
98 29	• • F	1:55:00 1:55:23 1:57					Nearby.

SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month June, 1945Page No. 11

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
99 29	•	1	49	43			Nearby.
	•	1	50	06			
	F	1	52				
100 29	•	22	10	00			Nearby.
101 30	•	2	20	04			Nearby.
	•	2	20	41			
	F	2	24				
102 30	•	5	38	26			Distant.
	F	6	38				
103 30	IP	18	19	38		7.0 N 11.5 E	Approximate distance 230 miles.
	IS	18	20	26			
	F	18	30				

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INSTRUMENTS	COMPONENT	T _c	V	h	DETERMINED
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Wood-Anderson	E - W	1.0	1370	20 to 1	May 28, 1945
Bosch-Omori	Not in operation				
Bosch-Omori					

Month July, 1945Page No. 12

No. and Date	Phase	Time G. M. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
104 1	e F	6:39:20 6:42				Nearby	
105 1	e e F	10:12:58 10:13:34 10:17				Nearby	
106 5	1P F	12:02:56 Vibrations were too rapid to clearly show beginning of S waves. 12:16			71.0N 76.0E	Approximate distance 100 miles. Intensity IV. Felt by many in the Canal Zone; in some favorably exposed locations dishes rattled and doors banged. A dispatch from Santa Fe, Province of Veraguas, Republic of Panama, located about 105 miles in a Westerly direction from Balboa Heights states: "This town was rocked at 7:05 A. M. today by a violent earthquake that spread panic among local residents because of the tremendous roar that preceded it. There were no casualties."	
107 5	e F	12:12:24 12:13:30				Nearby.	
108 6	1 F	2:22:31 2:27				Nearby.	
109 9	1P 1S F	11:57:22 11:57:53 12:06			5.0N 5.0E 21.0N 29.5E	Approximate distance 150 miles.	
110 9	1P 1S F	16:44:00 16:45:23 16:59			16.5N 11.0E	Approximate distance 500 miles.	

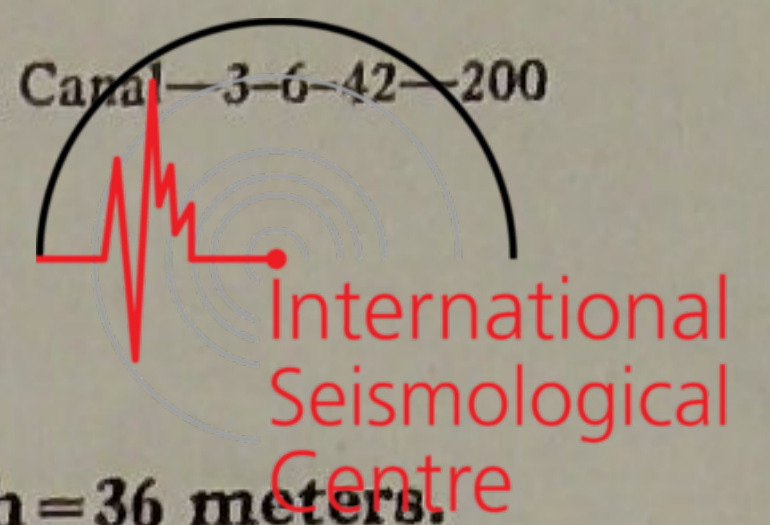
SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month July - 1945Page No. 13

No. and Date	Phase	Time G. M. T.	Period	AMPLI- TUDE	REMARKS
		^h ^m ^s	^s	mm	
111 10	e i F	7:09:00 7:09:32 7:11			Nearby
112 10	e i F	8:34:36 8:35:02 8:36			Nearby
113 12	eP iS F	0:02:13 0:02:52 0:06			Approximate distance 190 miles.
114 12	e F	9:16:09 9:25			Distant
115 13	e F	19:42:17 19:45			Nearby
116 15	e F	5:54:00 6:11			Distant
117 16	iP iS F	23:27:18 23:27:48 23:32		4.8N 4.0E	Approximate distance 145 miles.
118 22	eP iS F	0:16:21 0:16:45 0:20		11.0N 11.0E	Approximate distance 115 miles.
119 23	e e F	9:46:18 9:47:08 9:51			Nearby
120 24	e i F	16:00:35 16:01:04 16:03			Nearby
121 28	e i F	11:15:07 11:15:46 11:19			Nearby
122 28	e F	13:18:28 13:23			Nearby

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h = 36 meters.

Lithologic foundation: Basalt.

Time Correction: Within 1.0 sec.

INSTRUMENTS—FIXED CONSTANTS

INSTRUMENTS	SYMBOL	REGISTRATION	DAMPING	PAPER SPEED	MASS
Wood-Anderson	I	Photographic	Magnetic	60 mm. per min.	1.3 gr.
Bosch-Omori	II	Smoked Sheet	Air	15 mm. per min.	100 kg.

INSTRUMENTS—DETERMINED CONSTANTS

INSTRUMENTS	COMPONENT	T.	V	h	DETERMINED
Wood-Anderson	N-S	1.0	1370	20 to 1	May 28, 1945
Wood-Anderson	E-W	1.0	1370	20 to 1	May 28, 1945
Bosch-Omori	} Not in operation				
Bosch-Omori					

Month August 1945Page No. 14

No. and Date	Phase	Time G. M. T.			Period	AMPLI- TUDE	REMARKS
		h	m	s			
#123 3	1 P	4	12	34		5.0N 6.7E 16.0N 17.0E	Approximate distance 240 miles
	1 S	4	13	24			
	F	5	00				
#124 3	• P	6	35	44		3.0N 3.0E	Approximate distance 245 miles Record obscured by beginning of No. 125
	1 S	6	36	35			
	F	-	-	-			
#125 3	• P	6	45	02			Approximate distance 245 miles Record obscured by beginning of No. 126
	1 S	6	45	53			
	F	-	-	-			
#126 3	•	6	59	27			Nearby
	F	6	15				
#127 3	•	9	55	25			Nearby
	F	10	02				
#128 3	•	10	50	35			Nearby
	F	11	00				
#129 4	1 P	21	17	30		17.0N 17.0E	Approximate distance 150 miles
	1 S	21	18	00			
	F	22	00				
#130 10	• P	11	22	58			Approximate distance 1050 miles
	• S	11	25	47			
	F	11	45				
#131 10	•	14	11	47			Distant
	F	14	24				
#132 10	•	21	52	36			Nearby
	F	21	54				
#133 11	• P	0	34	41		19.0N 15.0E 27.0N 34.0E	Approximate distance 220 miles
	1 S	0	35	27			
	F	1	00				
#134 11	•	3	35	58			Nearby
	F	3	37				
#135 11	•	4	16	49			Nearby
	F	4	21				

SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

August 1945

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Month -----

No. and Date	Phase	Time G. M. T.	Period	AMPLI- TUDE	REMARKS
#136 11	1 P	4:55:43 ^s	s	5.0N	Approximate distance 155 miles
	1 S	4:55:15 ⁵⁶		4.5E	
	F	5:00		13.0N 21.0E	
#137 11	•	8:04:00			Nearby
	F	8:08			
#138 19	•	7:33:08			Nearby
	F	7:40			
#139 20	•	14:34:40			Nearby
	F	14:37			
#140 20	• P	21:51:42			Approximate distance 70 miles
	1 S	21:51:56			
	F	21:54			
#141 21	•	16:34:04			Distant
	F	16:48			

G. E. MATTHEW
Chief Hydrographer

THE PANAMA CANAL
DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF METEOROLOGY AND HYDROGRAPHY



SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

h = 36 meters.

Lithologic foundation: Basalt.

Time Correction: Within 1.0 sec.

INSTRUMENTS—FIXED CONSTANTS

INSTRUMENTS	SYMBOL	REGISTRATION	DAMPING	PAPER SPEED	MASS
Wood-Anderson	I	Photographic	Magnetic	60 mm. per min.	1.3 gr.
Bosch-Omori	II	Smoked Sheet	Air	15 mm. per min.	100 kg.

INSTRUMENTS—DETERMINED CONSTANTS

INSTRUMENTS	COMPONENT	T ₀	V	h	DETERMINED
Wood-Anderson	N-S	1.0	1370	20 to 1	May 28, 1945
Wood-Anderson	E-W	1.0	1370	20 to 1	" "
Bosch-Omori)	NOT IN OPERATION				
Bosch-Omori)					

Month September, 1945

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No. and Date	Phase	Time G. M. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
#142 4	o	12	11	35			Nearby
	o	12	12	29			
	F	12	16				
#143 9	o	13	01	28			Nearby
	F	13	08				
#144 11	o	14	16	07			Nearby
	F	14	20				
#145 12	o	19	57	04			Nearby
	i	19	57	30			
	F	20	00				
#146 13	i	11	25	06			Distant Destructive quake in central Chile.
	F	11	40				
#147 17	IP	4	15	04		4.5 N	Approximate distance 35 miles Intensity II. Felt by many residents at Pacific Side of Canal Zone.
	IS	4	15	11		3.0 E	
						45.0 N	
						55.0 E	
	F	4	18				
#148 26	o	14	31	08			Nearby
	F	14	36				
#149 - 26	o	18	58	47			Nearby
	F	19	03				

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SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

h = 36 meters.

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INSTRUMENTS—FIXED CONSTANTS

INSTRUMENTS	SYMBOL	REGISTRATION	DAMPING	PAPER SPEED	MASS
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INSTRUMENTS—DETERMINED CONSTANTS

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Bosch-Omori)	Not in operation				
Bosch-Omori)					

Month October, 1945Page No. 17

No. and Date	Phase	Time G. M. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
#150 3	eP	3	49	12		5.0N 3.5E	Approximate distance 45 miles
	IS	3	49	21			
	F	3	51				
#151 5	e	23	19	26			Distant
	F	23	30				
#152 7	e	13	25	52			Distant
	F	4	00	00			
#153 11	e	16	57	28			Nearby
	F	17	03				
#154 14	1P	10	41	25		3.0N	Approximate distance 50 miles
						4.0E	
	IS	10	41	36		20.0N	
	F	10	48			17.0E	
#155 20	e	4	47	30			Nearby
	e	4	48	05			
	F	4	53				
#156 27	e	11	27	36			Distant
	F	11	45				

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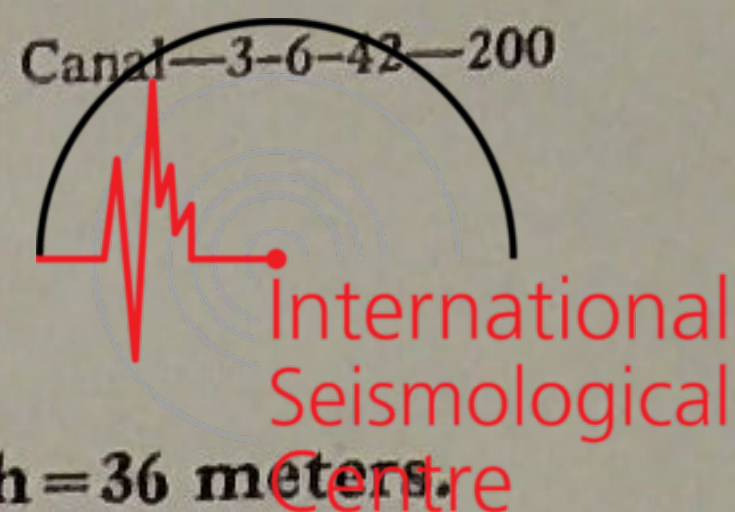
THE PANAMA CANAL
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SECTION OF METEOROLOGY AND HYDROGRAPHY

SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Lithologic foundation: Basalt.

Time Correction: $h=36$ meters. Within 1.0 sec.

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INSTRUMENTS—DETERMINED CONSTANTS

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Wood-Anderson	E-W	1.0	1370	20 to 1	May 28, 1945
Bosch-Omori)	Not In Operation				
Bosch-Omori)					

Month November, 1945Page No. 18

No. and Date	Phase	Time G. M. T.			Period	AMPLI- TUDE mm	REMARKS
		h	m	s			
#157 4	i P	18	16	03			Approximate distance 65 miles.
	i S	18	16	16		6.5N 6.0E	
	F	18	18				
#158 8	e P	21	33	11			Approximate distance 190 miles.
	i S	21	33	51		3.0N 2.5E	
	F.	21	39				
#159 12	i P	5	32	01		4.0N 5.0E	Approximate distance 55 miles.
	i S	5	32	12		26.0-N 23.0-E	
	F	5	40				
#160 12	e	5	37	33			Nearby - Aftershock of No. 159.
	e	5	37	43		3.0N 2.5E	
	F	5	39				
#161 15	i	15	59	50			Distant
	e	16	00	57			
	F	16	10				
#162 15	i	21	53	21			Distant
	F	22	06				

SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

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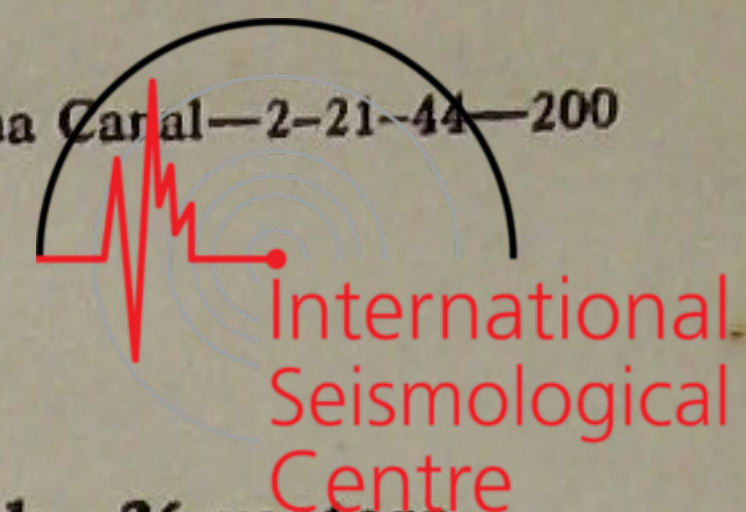
Month November, 1945.

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
#163 16	e i F	11: 09: 29					Distant.
		11: 10: 28					
		11: 15:					
#164 16	e F	23: 02: 07					Distant.
		23: 08					
#165 24	e e F	7: 09: 58					Nearby
		7: 10: 40					
		7:13					
#166 27	e F	18:11: 40					Nearby
		18: 14: 00					
#167 27	e F	22: 15: 00					Distant This is a very distant quake: L waves are the main features of the record.
		0: 45: 00					
#168 28	i e F	22: 23: 15					Nearby.
		22: 23: 55					
		22: 28					
#169 30	e P i S F	0: 26: 38					Approximate distance 300 miles.
Nov. 30		0: 27: 29					
		0: 36					
#170	e P e S F	6: 25: 39					9.0-N 7.0-E Approximate distance 145 miles.
Nov. 30		6: 26: 09					
		6: 28					

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MR 1433—Panama Canal—2-21-44—200



SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Lat. 8° 57' 39" N.

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Wood-Anderson	E-W	1.0	1370	20 to 1	May 28,
Bosch-Omori	Not in operation				
Bosch-Omori	Not in operation				

Month December, 1945

Page No. 20

No. and Date	Phase	Time G. M. T.	Period	AMPLI- TUDE mm	REMARKS
#171 1	e P	21 ^h 33 ^m 29 ^s			Approximate distance 40 miles Intensity I. Reported felt by residents of frame building near Gatun.
	i S	21: 33: 37		5.0-N 5.0-E	
	F	21: 36			
#172 2	e	8: 58: 06			Nearby
	F	9: 01			
#173 6	e P	8: 06: 50			Approximate distance 225 miles.
	e S	8: 07: 37		6.5-N 7.5-E	
	F	8: 13			
#174 8	e	1: 23: 14			Distant
	F	1: 35			
#175 13	e	22: 53: 57			Nearby
	F	22: 58			
#176 14	e P	9: 20: 47			Approximate distance 110 miles.
	i S	9: 21: 10		5.0-N 3.5-E	
	F.	9:24			
#177 14	e P	17: 29: 37			Distant
	F	17: 40			
#178 17	i P	17: 45: 32			Distant
	e	17: 46: 27			
	F	17: 52			
#179 20	e	4:19 : 00			Nearby
	F	3: 30			

SEISMOLOGICAL RECORD AT BALBOA HEIGHTS, CANAL ZONE

Month December, 1945.Page No. 21

No. and Date	Phase	Time G. M. T.			Period s	AMPLI- TUDE mm	REMARKS
		h	m	s			
#180 21	1 P	14:	56:	48		10.0 E	Approximate distance 20 miles N.S. record lost.
	e S	14:	56:	52		27.5E	
	F.	14:	58				
#181 23	e P	8:	13:	58			Distant
	F	8:	36				
#182 23	e P	13:	44:	43			Approximate distance 150 miles.
	i S	13:	45:	14			
	F	13:	47				
#183 20	e	18:	07:	50			Distant
	e	18:	11:	26			
	e L	18:	49				
	F	19:	50				

L. T. CHAPEL
Acting Chief Hydrographer