

83

THE PANAMA CANAL
DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS



REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
(AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)

Month January Year 1931

Latitude 8° 57' 39" north. **N-S 100 K**
Longitude 79° 33' 29" west. **Magnification 35**

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END	MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.				
1	9:56:48		10:01:00		10:01:32		10:02:20		10:23:54	0.6	20	Distance 1200 miles
2	11:23:04		-		-		-		11:30:34	-	20	Distance ?
3												
4												
5												
6												
7												
8												
9												
10	7:02:56		7:03:30		7:03:33		7:03:38		7:06:04	1.0	20	Distance 206 miles
11	10:23:10		-		-		-		10:24:16	-	20	Distance ?
12												
13												
14												
15	1:55:00		1:58:36		2:00:51		1:56:01		3:00:00	4.5	20	Distance 1320 miles Direction probably NW
16	Slight tremors from distant disturbance from 19:24:04 to 19:54:11											
17	Slight tremors from distant disturbance from 3:05:00 to 3:20:00											
18	Slight tremors from distant disturbance from 21:20 to 21:53											
19												
20												
21												
22												
23												
24												
25												
26												
27												
28	Very slight tremors from distant disturbance from 22:25 to 22:48											
29												
30												
31												

P. T. Preliminary tremors, L. W. Large waves.
Greenwich mean time five hours faster than 75th meridian time.

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SECTION OF SURVEYS
REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
 (AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)



Month January Year 1931

Latitude $8^{\circ} 57' 39''$ north.

E-W 100 K

Longitude $79^{\circ} 33' 29''$ west.

Magnification 35

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1													
2	Instrument out of order See N-S report												
3													
4													
5													
6													
7													
8													
9													
10													
11	Slight seismic tremors from local disturbance. Trace not well defined												
12	see N-S report												
13													
14													
15	1:55:00		1:58:36		2:00:15		1:55:22		3:00:00		8.0	20	Distance 1320 miles Direction probably NW
16													
17	Slight tremors. Time marker not working. See N-S report												
18	Slight seismic tremors from distant disturbance from 21:20 to 21:55												
19													
20													
21													
22													
23													
24													
25													
26													
27													
28	Very slight tremors between 22:25 and 22:48												
29													
30													
31													

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DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1													
2													Slight seismic tremors from distant disturbance between 23:12 and 0:19 Feb. 3,
3													
4													
5													
6													
7													Slight seismic tremors from distant disturbance between 3:34 and 3:48
8													
9													
10													Slight seismic tremors from distant disturbance between 7:20 and 8:35
11													
12													
13													Slight seismic tremors from distant disturbance between 2:17 and 2:52
14													
15													
16													
17													
18													
19													
20													
21	22:10:53		22:11:15		22:11:17		22:11:21		22:16:00		7.0	20	Distance 140 miles Direction ?
22													
23													
24	6:03:13		6:03:37		6:03:38		6:03:38		6:06:00		0.75	20	Distance 140 miles Direction ?
25													
26													
27													
28													
29													
30													
31													

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SECTION OF SURVEYSREGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
(AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)Month February Year 1931Latitude $8^{\circ} 57' 39''$ north.

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Magnification 35

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1													
2													Slight seismic tremors from distant disturbance between 23:12 and 0:19 Feb. 3,
3													
4													
5													
6													
7													Slight seismic tremors from distant disturbance between 3:34 and 3:48
8													
9													
10													
11													Slight seismic tremors from distant disturbance between 7:20 and 8:35
12													
13													Slight seismic tremors from distant disturbance between 2:17 and 2:52
14													
15													
16													
17													
18													
19													
20													
21													Record lost See N-S report
22													
23													
24													Record lost See N-S report
25													
26													
27													
28													
29													
30													
31													

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REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
 (AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)



Month March Year 1931

Latitude 8° 57' 39" north.

N-S 100 K

Longitude 79° 33' 29" west.

Magnification 35

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1	Slight tremors from local disturbance between 12:09 and 12:11												
2													
3													
4	17:54:23	17:54:45	17:54:48	17:54:51	18:01:00	4.5	20	Distance 140 miles					
5													
6													
7	0:43:29	0:44:53	0:45:50	0:47:22	1:12:00	4.0	20	Distance 500 miles					
8													
9	Slight tremors from distant disturbance between 4:58 and 5:34												
10													
11													
12													
13													
14													
15													
16													
17													
18	Slight tremors from distant disturbance between 8:10 and 9:25												
18 19	Slight tremors from distant disturbance between 20:23 and 20:44												
20													
21													
22													
23													
24													
25	16:04:24	16:05:29	16:06:22	16:07:49	16:26:20	2.0	35	Distance 450 to 500 miles. Destroyed City of Managua, Nicaragua.					
26													
27													
28													
29													
30													
31													

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Month MARCH Year 1931

Latitude $8^{\circ} 57' 39''$ north. **E-W 100 K**
 Longitude $79^{\circ} 33' 29''$ west. **Magnification 35**

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1	Slight tremors from local disturbance between 12:09 and 12:11												
2													
3													
4	17:54:26		17:54:48		17:54:50		17:54:55		18:01:00		4.5	20	Distance 140 miles
5													
6													
7	0:43:30		0:44:54		0:45:55		0:46:24		1:12:00		3:0	20	Distance 500 Miles
8													
9	Slight tremors from distant disturbance between 4:58 and 5:34												
10													
11													
12													
13													
14													
15													
16													
17													
18	Slight tremors from distant disturbance between 8:10 and 9:25												
19	Slight tremors from distant disturbance between 20:23 and 20:44												
20													
21													
22													
23													
24													
25	16:05:09		16:05:36		16:06:24		16:07:04		16:25:24		1.0	20	Distance 450 to 500 miles. Destroyed city of MANAGUA? Nicaragua.
26													
27													
28													
29													
30													
31													

P. T. Preliminary tremors, L. W. Large waves,
 Greenwich mean time five hours faster than 75th meridian time.

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REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
 (AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)

Latitude 8° 57' 39" north.
 Longitude 79° 33' 29" west.

N-S 100 K
 Magnification 35

Month April 1931. Year _____

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11	0:59:22		0:59:43		059:54		0:59:47		1:03:00		1.0	20	Qake distinctly felt in La Palma R.P. Distance 120 miles.
12											/		
13	Trace very indistinct. See E-W report.												
14													
15													
16													
17													
18													
19	Very slight tremors recorded 17:44 to 17:49											Distance and direction indeterminate.	
20													
21													
22													
23													
24													
25	Very slight tremors recoded 4:48 to 4:52											Distance and direction indeterminate.	
26													
27													
28													
29													
30													
31													

P. T. Preliminary tremors. L. W. Large waves.
 Greenwich mean time five hours faster than 75th meridian time.

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SECTION OF SURVEYS

REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z. (AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)



Month April 1931, Year _____

Latitude 8° 57' 39" north.
Longitude 79° 33' 29" west.

~~E-W~~ 100 K
Magnification 35

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11	0:59:20	0:59:41	0:59:50	0:59:50	0:59:44	1:03:00	1.0	20	Quake distinctly felt in La Palma R.P.				
12							/		Distance 120 miles.				
13	13:09:51	13:10:02	13:10:05	13:10:07	13:10:39	0.5	20	Distance 60 miles.					
14							/						
15													
16													
17													
18													
19	Very slight tremors recorded 17:44 to 17:49										Distance and direction indeterminate.		
20													
21													
22													
23													
24													
25	Very slight tremors recorded 4:48 to 4:52										Distance and direction indeterminate.		
26													
27													
28													
29													
30													
31													

P. T. Preliminary tremors, L. W. Large waves,
Greenwich mean time five hours faster than 75th meridian time.



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REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
 (AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)

Month May 1951, Year _____

Latitude 8° 57' 39" north.
 Longitude 79° 33' 29" west.

N-S 100 K
Magnification 55

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE	2D GROUP COMMENCE	L. W. COMMENCE	MAXIMUM	END	MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h. m.	h. m.	h. m.	h. m.	h. m.	mm.	sec.	
1	22:59:21	23:40:52	23:41:39	23:42:12	23:01:00	0.4	20	Distance 520 miles Direction ?
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26	2:19:27	2:19:47	2:19:49	2:19:51	2:23:00	1.0	20	Distance 60 miles Direction ? Felt in La Palma and Obispo, R. P.
27								
28								
29								
30								
31								

P. T. Preliminary tremors, L. W. Large waves.
 Greenwich mean time five hours faster than 75th meridian time.

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 DEPARTMENT OF OPERATION AND MAINTENANCE
 SECTION OF SURVEYS



REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
 (AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)

Month July 1981 Year _____

Latitude 8° 57' 39" north.

E-W-100K

Longitude 79° 33' 29" west.

Magnification-35

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1	22	59	22	40	22	41	22	41	23	01	0.5	20	Distance 520 miles Direction ?
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26	2	19	2	19	2	19	2	19	2	23	0.5	20	Distance 60 miles. Direction indeterminate Felt in La Palma and Oaldia, R. P.
27													
28													
29													
30													
31													

P. T. Preliminary tremors, L. W. Large waves,
 Greenwich mean time five hours faster than 75th meridian time.

THE PANAMA CANAL
 DEPARTMENT OF OPERATION AND MAINTENANCE
 SECTION OF SURVEYS
REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
 (AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)

Month June Year 1931.

Latitude 8° 57' 39" north.
Longitude 79° 33' 29" west.

N-S 100 K
Magnification 35.

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1													
2													
3													
4													
5													
6													
7													
8	Slight seismic tremors recorded between 11:00:11 and 11:02:00											Distance and direction indeterminate.	
9													
10													
11													
12													
13													
14													
15													
16													
16	18:21:55	18:22:15	18:22:21	18:22:24	18:22:24	18:24:00	0.8	20	Distance 110 miles. Direction ? Felt by a few people.				
18													
19													
20													
21													
22													
23													
24													
25													
26													
27	10:04:22	10:04:35	10:04:35	10:04:36	10:07:00	1.0	20	Distance 55 miles. Direction ? Felt by residents of Canal Zone and R. of P.					
28													
30	Very slight tremors recorded 18:09 to 18:12												
30													
31													

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SECTION OF SURVEYS



REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
(AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)

Month June 1931. Year _____

Latitude 8° 57' 39" north.
Longitude 79° 33' 29" west.

E-W 100 K
Magnification 35.

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-23—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1													
2													
3													
4													
5													
6													
7													
8	Slight tremors recorded between 11:00:11 and 11:02:00											Distance and direction indeterminate?	
9													
10													
11													
12													
13													
14													
15													
16													
16	18:22:00	18:22:19	18:22:26	18:22:26	18:24:00	0.6	20	Distance 110 miles. Direction ? Felt by a few people.					
18													
19													
20													
21													
22													
23													
24													
25													
26													
27	10:04:17	10:04:30	10:04:30	10:04:31	10:07:00	0.6	20	Distance 55 miles. Direction ? Felt by residents of Canal Zone and R. of P.					
28													
29	Very slight tremors recorded 18:09 to 18:12												
30													
31													

P. T. Preliminary tremors, L. W. Large waves,
Greenwich mean time five hours faster than 75th meridian time.

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	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.	mm.	
11												
12												
13	1:51:04		1:51:28		1:51:32		1:51:32		1:54:00	0.8	20	Distance 155 miles Direction indeterminate
14												
15												
16	16:38:08		16:38:21		16:38:28		16:38:34		16:42:00	1.0	20	Distance 65 miles Direction ?
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
27												Very light tremors recorded 7:21 to 7:28. Distance and direction indeterminate.
27												Very light tremors recorded 16:36 to 16:45. Distance and direction indeterminate
31												Light tremors from distant disturbance recorded 25:01 to 25:04. Distance and direction?
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												

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DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1													
2													
63	1:51:06		1:51:50		1:51:33		1:51:33		1:54:00		0.6	20	Distance 135 miles Direction ?.
4													
5													
1177	16:38:10		16:38:23		16:38:29		16:38:34		16:42:00		0.5	20	Distance 65 miles. Direction ?.
7													
8													
27	Very light tremors recorded 7:21 to 7:28. Distance and direction indeterminate.												
27	Very light tremors recorded 16:36 to 16:45. Distance and direction indeterminate.												
11													
12													
13	Light tremors from distant disturbance recorded 23:01 to 23:04. Distance and direction ?												
31													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													

P. T. Preliminary tremors, L. W. Large waves,
 Greenwich mean time five hours faster than 75th meridian time.

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SECTION OF SURVEYS



REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
(AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)

Month August Year 1931.

Latitude $8^{\circ} 57' 39''$ north.
Longitude $79^{\circ} 33' 29''$ west.

N-S 100 K
Magnification. 352

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1													
2													
3													Distance and direction ?
4													Distance and direction ?
5													
6													
7													
10													Light tremors from distant disturbance recorded 21:51 to 23:31. Distance and direction indeterminate but no doubt tremors are of same origin as earthquake reported by the press to have occurred somewhere in Asia Minor.
8													
9													
10													
11													
12													Distance 50 miles. Direction ?
14	1:34:38		1:34:47		1:34:47		1:34:48		1:36:00		1.0	20	
13													
14													
15													Distance and direction ?
16													
1													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													

THE PANAMA CANAL
 DEPARTMENT OF OPERATION AND MAINTENANCE
 SECTION OF SURVEYS



REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
 (AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)

Month August Year 1931

Latitude 8° 57' 39" north.
 Longitude 79° 33' 29" west.

E-W 100 K
 Magnification 35.

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1													
2													
3													Distance and direction ?
4													Distance and direction ?
5													
6													
10													Light tremors from distant disturbance recorded 21:51 to 23:31. Distance and direction indeterminate but no doubt tremors are of same origin as the earthquake reported by the press to have occurred somewhere in Asia Minor.
8													
9													
10													
11													
12	1:34:37		1:34:46		1:34:46		1:34:46		1:36:00		1.0	20	Distance 50 miles. Direction ?
13													
14													
15													Distance and direction ?
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													

P. T. Preliminary tremors, L. W. Large waves,
 Greenwich mean time five hours faster than 75th meridian time.

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THE PANAMA CANALDEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYSREGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
(AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)Month S E P T E M B E R Year 1931Latitude 8° 57' 39" north.
Longitude 79° 33' 29" west.N-S 100 K
Magnification 35.

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1													
2													Distance 180 miles.
3	0:03:07		0:03:40		0:03:48		0:03:54		0:08:00		0.5	20	Direction indeter- minate.
4													Distance 180 miles.
5	2:13:16		2:13:48		2:13:57		2:13:57		2:18:00		0.5	20	Direction indeter- minate.
6													
7													
8													
9													Distance 240 miles.
7	7:51:57		7:52:39		7:54:06		7:55:07		8:02:00		2.5	20	Direction indeter- minate.
10													
11													
12													Distance 190 miles.
9	15:13:51		15:14:25		15:14:31		15:15:20		15:22:00		1.0	20	Direction indeter- minate.
13													
14													
15													Distance 250 miles.
12	15:42:34		15:43:19		15:44:18		15:45:36		15:58:00		2.0	20	Direction indeter- minate.
16													
17													
18													
25	Light tremors from distant disturbance recorded												
19												20	6:24 to 10:12 Distance and direction indeterminate.
20													
21													
26	Light tremors from distant disturbance recorded												
22												20	20:06 to 20:44 Distance and direction indeterminate.
23													
24													
25													
26													
27													
28													
29													
30													
31													

P. T. Preliminary tremors, L. W. Large waves,
Greenwich mean time five hours faster than 75th meridian time.

THE PANAMA CANAL
 DEPARTMENT OF OPERATION AND MAINTENANCE
 SECTION OF SURVEYS
REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
 (AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)



Month S E P T E M B E R Year 1931

Latitude 8° 57' 39" north.
 Longitude 79° 33' 29" west.

E-W 100 K
Magnification 35.

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1													
2													
3	0:03:07		0:03:41		0:03:47		0:03:54		0:08:00		0.5	20	Distance 180 miles. Direction indeter- minate.
4													
5	2:13:20		2:13:53		2:13:59		2:13:59		2:18:00		0.4	20	Distance 180 miles. Direction indeter- minate.
6													
7													
8	7:51:56		7:52:38		7:54:02		7:54:19		8:02:00		1.2	20	Distance 240 miles. Direction indeter- minate.
9													
10													
11	15:13:51		15:14:24		15:14:32		15:14:37		15:22:00		0.6	20	Distance 190 miles. Direction indeter- minate.
12													
13													
14	15:42:32		15:43:16		15:44:17		15:45:22		15:58:00		0.9	20	Distance 250 miles. Direction indeter- minate.
15													
16													
25	Light tremors from distant disturbance recorded												
18	6:24 to 10:12. Distance and direction indeterminate.												20
19													
28	Light tremors from distant disturbance recorded												
21	20:06 to 20:44. Distance and direction indeterminate.												20
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													

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THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS

REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
(AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)



Month OCTOBER Year 1931

Latitude $8^{\circ} 57' 39''$ north.
Longitude $79^{\circ} 33' 29''$ west.

N-S 100 K
Magnification 35.

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1													
2													
3													Faint tremors from distant disturbance recorded
4													19:34 to 21:27. Phases indistinct, long swells continue
5												20	intermittantly throughout period of quake.
6													
7													
8													Very faint tremors from distant disturbance recorded
9												20	1:16 to 2:40. Record weak, interpolation doubtful.
10													
11													
12													Light tremors recorded between 3:33 and 3:36.
13												20	Activity barely perceptible, but certainly seismic.
14													
15													Distance 220 miles.
16	3:58:18		3:58:56		3:59:04		3:59:18		4:17:00		16.0	20	Direction probably NW. Disturbance felt by several people.
17													
18													
19													Very light tremors from local disturbance recorded
20												20	14:33 and 14:37. Phases weak and uncertain.
21													
22													
23													Light tremors from local disturbance recorded
24													between 17:57 and 18:00. Phases too weak to determine
25												20	distance and direction.
26													
27													
28													
29													
30													
31													

P. T. Preliminary tremors, L. W. Large waves.
Greenwich mean time five hours faster than 75th meridian time.

THE PANAMA CANAL
DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS
REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
 (AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)



Month OCTOBER Year 1931.

Latitude $8^{\circ} 57' 39''$ north.
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E-W 100 K
Magnification 35.

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1													
2													
3													
3													Faint tremors from distant disturbance recorded
4													19:34 to 21:27. Phases uncertain, long swells continue
5												20	intermittantly throughout period of quake.
6													
7													
8													
10													Very faint tremors from distant disturbance recorded
9													ed 1:16 to 2:40. Record weak, interpolation doubtful.
10													
11													
12													
12													Light tremors recorded between 3:33 and 3:36.
13													Activity barely perceptible but certainly seismic.
14													
15													
16	3:58:19		3:58:57		3:59:05		3:59:29		4:17:00		12.5	20	Distance 220 miles. Direction probably, NW. Disturbance felt by several people.
17													
18													
19													
20													Very light tremors from local disturbance recorded
20													14:35 to 14:37. Phases weak and uncertain.
21													
22													
23													
23													Light tremors from local disturbance recorded
24													between 17:57 and 18:00. Phases too indistinct to
25													determine distance and direction.
26													
27													
28													
29													
30													
31													

P. T. Preliminary tremors. L. W. Large waves.
 Greenwich mean time five hours faster than 75th meridian time.

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THE PANAMA CANAL
 DEPARTMENT OF OPERATION AND MAINTENANCE
 SECTION OF SURVEYS



REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
 (AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)

Month NOVEMBER Year 1931.

Latitude 8° 57' 39" north.
 Longitude 79° 33' 29" west.

H-S 100 K
Magnification 35.

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1													
2													
3	2											20	Light tremors from distant disturbance recorded ed 0:36 to 1:05. Phases very weak, ending uncertain.
4													
5													
6													
7	23											20	Light tremors from nearby disturbance recorded 6:17 to 6:19. Record weak, interpolation doubtful.
8													
9													
10													
11	23											20	Light tremors from nearby disturbance recorded 19:45 to 19:48. Phases weak and uncertain.
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													

P. T. Preliminary tremors. L. W. Large waves.
 Greenwich mean time five hours faster than 75th meridian time.

THE PANAMA CANAL
DEPARTMENT OF OPERATION AND MAINTENANCE
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E - W 100 K
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MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1													
2													
32												20	Light tremors from distant disturbance recorded 0:36 to 1:05. Phases weak, ending uncertain.
4													
5													
6													
7												20	Light tremors from nearby disturbance recorded 6:17 to 6:19. Record weak, interpolation doubtful.
23													
8													
9													
10													
11												20	Light tremors from nearby disturbance recorded 19:45 to 19:48. Phases weak and uncertain.
23													
12													
13													
14													
15													
16													
17													
18													
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20													
21													
22													
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25													
26													
27													
28													
29													
30													
31													

P. T. Preliminary tremors, L. W. Large waves,
 Greenwich mean time five hours faster than 75th meridian time.

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THE PANAMA CANALDEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYSREGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
(AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)Month DECEMBER Year 1931.Latitude $8^{\circ} 57' 39''$ north.
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Magnification 35.

Greenwich mean time midnight to midnight.

MR 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1													
2													
3 ⁹													
4												20	Light tremors from local disturbance recorded between 1:25 and 1:27. Phases weak and uncertain.
5													
6													
7 ¹⁸													
8													
9												20	Light tremors from local disturbance recorded between 13:06 and 13:09. Distance and direction indeterminate.
10													
11													
12													
20													
13												20	Light tremors recorded between 15:01 and 15:10. Distance and direction indeterminate.
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													

P. T. Preliminary tremors, L. W. Large waves.
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MR. 9566—Panama Canal—4-4-28—1,000

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.			
1													
2													
3													
4												20	Light tremors from local disturbance recorded between 1:25 and 1:27. Phases weak and uncertain.
5													
6													
7													
8													
9												20	Light tremors from local disturbance recorded between 13:06 and 13:09. Distance and direction indeterminate.
10													
11													
12													
13												20	Light tremors recorded between 15:01 and 15:10. Distance and direction indeterminate.
14													
15													
16													
17													
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19													
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22													
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24													
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27													
28													
29													
30													
31													

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