

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF METEOROLOGY AND HYDROGRAPHY

REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.

(AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)



Month January Year 1929

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

Greenwich mean time midnight to midnight.

MR 73363

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													
12													Distance 5,000 miles. Direction NW Epi-center off Alaskan coast. Trace poorly defined. Details are uncertain. Epi-center position taken from report of U.S. Coast and Geodetic Survey.
13	0:20:45		0:50:07		0:32:47		0:36:07		1:30:00		1.0 ✓	20	
14													
15													
16													Distance 1,000 miles. Epi-center off Venezuelan coast. 50 killed 1,000 injured in town of Cumana, Venezuela according to press report
17	11:49:02		11:51:46		11:52:44		11:54:16		12:38:00		1.6 ✓	20	Distance 100 miles. Direction? local inhabitants some
18	3:18:37		3:18:55		3:19:15		3:20:51		3:40:00		7.0	20	Distance & direction? probably same Epi-center as other quakes on 19th.
19	Slight tremors from local disturbance from (4:49:20 to 4:52:00; 14:17:00 and from 22:17:00 to 22:20:00)												
19	18:17:48		18:18:05		18:18:05		18:18:11		18:20:01		1.1	20	Dist. about 100 M. Direction?
20													
21													
22	19:29:32		19:30:36		19:30:53		19:31:17		19:37:00		1.3	20	Distance about 370 M. Direction?
23	0:12:19		0:13:19		0:13:39		0:14:31		0:22:00		0.7	20	Distance about 340 M. Direction?
24	Slight seismic tremors between 7:09:00 and 7:14:00												
25	#####												
26	#####												
26	20:39:25		20:41:37		20:42:24		20:55:26		21:53:00		7.5 ✓	20	Distance 800 miles. Direction WNW Epi-center in Atlantic Ocean west of Costa Rica
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 January Year 1929

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

Greenwich mean time midnight to midnight.

MR 73363

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													
12													
13													Distance 5000 miles Direction NW. Epi- center off Alaskan Coast. Trace poorly defined. Details are uncertain. Epi-center position taken from report of US Coast & Geodetic Survey
14													
15													
16													
17													Distance 1000 M. Epi- center off Venezuelan coast. 50 killed 1000 injured in town of Cumana, Venezuela ac- cording to press rprs. Dis. 100 M. Direction? Felt by some local residents.
18													
19													
19													Dis. & Dir? but proba- bly same epi-center as other quakes on 19th. Dis. about 100 M. Direction?
20													
21													
22													Dis. about 370 M. Dir?
23													Distance about 340 M. Direction?
23													Distance & direction? Probably aftershock of quakes above.
25													
26													
27													Distance 800 miles Direction NW. Epi- center in Atlantic Ocean west of Costa Rica Costa Rica
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



EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **602** Date **January 13**, 192**9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	0: 20: 43	Slight
Second preliminary tremors began	0: 30: 07	tremors
Long waves began	0: 32: 47	between
Maximum	0: 36: 07	0: 20: 43
End of principal portion	1: 15: 00	and
End of earthquake	1: 30: 00	1: 30: 00
	mm.	mm.
Maximum amplitude	1.0	
Average period of waves	s.	s.
First preliminary tremors	5	
Second preliminary tremors	12	
Long waves	---	
Maximum	14	
End of principal portion	---	
End portion	---	
Period of pendulum	20	20
Magnification	35	35

REMARKS: ~~100-K-Bosch-Omori instruments; damping medium. Distance about 5000 miles. Direction NW. Epi-center off southern Alaskan Coast. Trace poorly defined; details are very uncertain. Distance and direction taken from report of U.S. Coast and Geodetic Survey.~~

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SECTION OF SURVEYS

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **605** Date **January 17, 1922** Greenwich mean time, midnight to midnight.



PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	11:49:02	Record
Second preliminary tremors began	11:51:46	Barred
Long waves began	11:52:44	
Maximum	11:54:16	
End of principal portion	12:08:00	
End of earthquake	12:38:00 ?	
	mm.	mm.
Maximum amplitude	1.6	
Average period of waves	s.	s.
First preliminary tremors	-	
Second preliminary tremors	-	
Long waves	16	
Maximum	18	
End of principal portion	10	
End portion	-	
Period of pendulum	20	
Magnification	35	

REMARKS: **100-K-Bosch-Onori instruments; damping medium. Distance about 1,000 miles.**

Epi-Center off Venezuelan coast. 200 killed, 1,000 injured, and buildings wrecked in town of Cumana, Venezuela 1,050 miles from Panama, according to United Press reports.



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EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **604** Date **January 19,** 192**9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	3:18:37	3:18:39
Second preliminary tremors began	3:18:55	3:18:58
Long waves began	3:19:15	3:19:26
Maximum	3:20:51	3:19:58
End of principal portion	3:25:00	3:23:30
End of earthquake	3:40:00	3:35:00
	mm.	mm.
Maximum amplitude	7.0	3.5
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves	5	5
Maximum	8	7
End of principal portion		
End portion		
Period of pendulum	20	20
Magnification	35	35

REMARKS: **100K Bosch-Onori instruments; damping medium. Distance about 100 miles; direction? Felt by some local residents.**



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EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet

Seismic Record No. **005** Date **January 19, 1929** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began		
Second preliminary tremors began		
Long waves began	Slight tremors from a local disturbance from 4:49:20	
Maximum	to 4:53:00	
End of principal portion		
End of earthquake		
	mm.	mm.
Maximum amplitude		
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum		
Magnification		

REMARKS: **100K Bosch-Omori instruments; damping medium. Distance and direction (?) but probably an aftershock of quake no. 604**

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SECTION OF SURVEYS



EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **606** Date **January 19**, 192**9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began		
Second preliminary tremors began		
Long waves began	Slight seismic tremors from local disturbance	
Maximum	between 14:14:00 and 14:17:00	
End of principal portion		
End of earthquake		
	mm.	mm.
Maximum amplitude		
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum		
Magnification		

REMARKS: **100-K-Bosch-Omori instruments; clamping medium. Distance and direction? But probably pre-shocks to quake 607.**



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EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **607** Date **January 19**, 192**9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
First preliminary tremors began	18:17:48	18:17:48
Second preliminary tremors began	18:18:05	18:18:04
Long waves began	18:18:05	18:18:04
Maximum	18:18:11	18:18:10
End of principal portion	18:18:31	18:18:34
End of earthquake	18:20:01	18:20:08
	mm.	mm.
Maximum amplitude	1.1	1.3
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum	20	20
Magnification	35	35

REMARKS: **100-K-Bosch-Omori instruments; clamping medium. Distance about 90 miles. Direction?**



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EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **608** Date **January 19**, 192⁹ Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began		
Second preliminary tremors began		
Long waves began Slight seismic tremors from local disturbance		
Maximum between 22:17:00 and 22:20:00		
End of principal portion		
End of earthquake		
	mm.	mm.
Maximum amplitude		
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum		
Magnification		

REMARKS: **100-K-Bosch-Omori instruments; clamping medium. Probably aftershock to quake 607.**

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EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **609** Date **January 22, 1929**, 192... Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
First preliminary tremors began	19:29:32 ^{h m s.}	19:29:22 ^{h m s.}
Second preliminary tremors began	19:30:36	19:30:28
Long waves began	19:30:53	19:30:36
Maximum	19:31:17	19:30:40
End of principal portion	19:32:04	19:31:20
End of earthquake	19:37:00	19:36:00
	mm.	mm.
Maximum amplitude	1.3	1.0
Average period of waves	S.	S.
First preliminary tremors	-	-
Second preliminary tremors	2	-
Long waves	8	1
Maximum	8	2
End of principal portion	6	1
End portion	-	-
Period of pendulum	20	20
Magnification	35	35

REMARKS: **100-K- Boscé Omori instruments; damping medium. Distance about 370 miles.**

Direction?

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EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **610** Date **January 23, 1929**, 192 Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	0:12:19	0:12:19
Second preliminary tremors began	0:13:19	0:13:18
Long waves began	0:13:39	0:13:46
Maximum	0:14:31	0:14:02
End of principal portion	0:16:05	0:15:02
End of earthquake	0:22:00	0:20:00
	mm.	mm.
Maximum amplitude	0.7	0.5
Average period of waves	s.	s.
First preliminary tremors	-	-
Second preliminary tremors	2	1
Long waves	6	5
Maximum	8	6
End of principal portion	7	6
End portion	-	-
Period of pendulum	20	20
Magnification	35	35

REMARKS: **100-K- Bosch Omori instruments; damping medium. Distance about 340 miles,
Direction?**





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EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **611** Date **January 23, 1929**, 192 Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')			E-W COMPONENT (Azimuth 90° 07')		
	h.	m.	s.	h.	m.	s.
First preliminary tremors began						
Second preliminary tremors began						
Long waves began	Slight seismic tremors between 7:09:00 and 7:14:00					
Maximum						
End of principal portion						
End of earthquake						
			mm.			mm.
Maximum amplitude						
Average period of waves			s.			s.
First preliminary tremors						
Second preliminary tremors						
Long waves						
Maximum						
End of principal portion						
End portion						
Period of pendulum						
Magnification						

REMARKS: **100-K-Bosch Omori instruments; damping medium. Distance and Direction?**
but probably aftershocks of quakes 609 and 610

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EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **612** Date **January 24**, 192**9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	20:39:25	20:39:21
Second preliminary tremors began	20:41:57	20:41:57
Long waves began	20:42:24	20:42:27
Maximum	20:55:26	20:54:49
End of principal portion	21:00:42	21:01:51
End of earthquake	21:53:00	21:45:00
	mm.	mm.
Maximum amplitude	7.5	2.0
Average period of waves	s.	s.
First preliminary tremors	5	4
Second preliminary tremors	6	6
Long waves	15	15
Maximum	11	12
End of principal portion	10	11
End portion	--	--
Period of pendulum	20	20
Magnification	35	35

REMARKS: **100-K-Bosch Omori instruments; damping medium. Distance 800 miles.**

direction WNW Epicenter in Atlantic Ocean west of Costa Rica.

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Month February Year 1929

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

NS - 100 K

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

Magnification 35

Greenwich mean time midnight to midnight.

MR 73363

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	0:10:06		0:18:04		0:24:00		0:32:58		1:45:0		3.2	20	Distance 4000 miles Epicenter in Atlantic Ocean.
3													Distance 650 miles
4	2:57:50		2:59:42		-		-		22:07:00?		-	20	Direction ?
5													
6													
7													
8													
9													
10	15:42:12		15:44:44		15:45:26		15:46:56		16:17:00?		1.5	20	Distance ⁹ 600 miles Direction NW Epicenter in Pacific Ocean
11													
12													
13													
14													
15	8:07:16		8:09:26		8:10:22		8:12:34		8:43:00		1.0	20	Distance about 750 miles. Epicenter in Pacific Ocean west of ^{NICAR} Managua .
16													
17													
18													
19													
20													
21	6:00:00		6:00:42		6:00:52		6:00:58		6:08:00		1.0	20	Distance about 240 mi. Direction ?
22	20:49:02		20:54:50		20:57:35		20:57:46		21:42:00		1.0	20	Distance about 2500 mi. Direction ?
23	Seismic tremors from 13:50:? to 14:48:00												
24													
25	Record lost while sheets were being changed.												
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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Month February Year 1929Latitude 8° 57' 39" north. EW - 100 K
Longitude 79° 33' 29" west. Magnification 35

Greenwich mean time midnight to midnight.

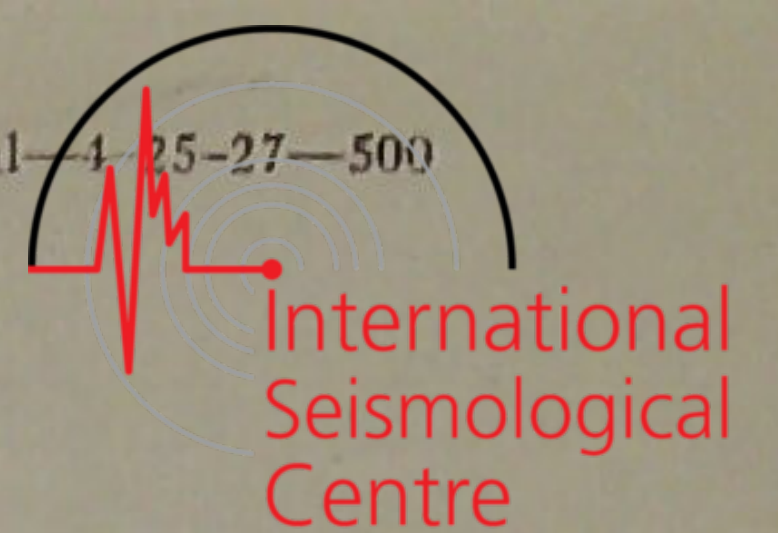
MR 73363

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	0:10:04		0:18:00		0:24:20		0:33:28		1:30:00		1.0	20	Distance about 4000 mi. Direction ESE. Epicenter in Atlantic Ocean.
3													
4	21:58:54		21:59:42?		--		--		22:04:00?		-	20	Distance 650 miles. Direction ?
5													
6													
7													
8													
9													
10	15:42:12		15:44:44?		15:46:58		15:46:58		16:07:00?		1.0	20	Distance 900 miles. Epicenter to north-westward in Pacific Ocean.
11													
12													
13													
14													
15	8:07:16		--		8:11:14		--		8:36:00		-	20	Distance about 750 miles with epicenter in Pacific Ocean, west of ^{NICAR} Managua.
16													
17													
18													
19													
20													
21	6:00:00		6:00:42		--		--		--		0.5	20	Direction ? Distance about 240 mi.
22	Seismic tremors from 20:49:03 to 21:32:00												Distance about 2500 miles. Direction ?
23	Seismic tremors from 13:50:? to 14:48:00												(23) Artificial motion superimposed upon record; seismic tremors indistinct and uncertain Distance and Direction?
24													
25	Record lost while sheets were being changed.												
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



EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **613** Date **February 2,** 192⁹. Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	0:10:06	0:10:04
Second preliminary tremors began	0:18:04	0:18:00
Long waves began	0:24:00	0:24:20
Maximum	0: 32:58	0:33:28
End of principal portion	0:40:28	0:44:00
End of earthquake	1:45:00	1:50:00
	mm.	mm.
Maximum amplitude	3.2	1.0
Average period of waves	s.	s.
First preliminary tremors	7	-
Second preliminary tremors	8	-
Long waves	20	-
Maximum	13	20
End of principal portion	13	-
End portion	-	-
Period of pendulum	20	35
Magnification		

REMARKS: **100-K-Bosch Oinori instruments; damping medium. Distance about 4000 miles, direction ESE. Epi-center in Atlantic Ocean just below Equator.**



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EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **014** Date **February 4,** 192**9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	21:57:50	21:59:54
Second preliminary tremors began	21:59:42?	21:59:42?
Long waves began		
Maximum		
End of principal portion		
End of earthquake	22:07:00?	22:04:00?
	mm.	mm.
Maximum amplitude		
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum	20	20
Magnification	35	35

REMARKS: **100K Bosch-Omori instruments; damping medium. Distance 650 miles? Direction?**

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EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **615** Date **February 10,** 192**9**. Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	15:42:12	15:42:12
Second preliminary tremors began	15:44:44	15:44:44?
Long waves began	15:45:26	15:46:58
Maximum	15:46:56	15:46:58
End of principal portion	15:50:00	15:48:00
End of earthquake	16:17:00?	16:07:00?
	mm.	mm.
Maximum amplitude	1.5	1.0
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves	17	19
Maximum	18	18
End of principal portion		
End portion		
Period of pendulum	20	20
Magnification	35	35

REMARKS: **100K Bosch-Omori instruments; damping medium. Distance about 900 miles with epi-center probably to the northwestward in the Pacific Ocean.**

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS



EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **616** Date **February 15**, 192⁹ Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began.....	8:07:16	8:07:16
Second preliminary tremors began.....	8:09:26	--
Long waves began.....	8:10:22	8:11:14
Maximum.....	8:12:34	--
End of principal portion.....	8:22:30	--
End of earthquake.....	8:43:00	8:36:
	mm.....	mm.....
Maximum amplitude.....	1.0	--
Average period of waves.....	s.....	s.....
First preliminary tremors.....		
Second preliminary tremors.....		
Long waves.....		
Maximum.....		
End of principal portion.....		
End portion.....		
Period of pendulum.....	20	20
Magnification.....	35	35

REMARKS: **100 K Bosch-Omori instruments; damping medium. Distance about 750 miles with epi-center in Pacific ocean west of Nicaragua.**

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS



EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **617** Date **February 22,** 192**9**. Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	6:00:00	6:00:00
Second preliminary tremors began	6:00:42	6:00:42
Long waves began	6:00:52	-
Maximum	6:00:53	-
End of principal portion	6:01:24	-
End of earthquake	6:03:00	-
	mm.	mm.
Maximum amplitude	1.0	0.5
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum	20	20
Magnification	35	35

REMARKS: **100K Bosch Omori instruments; damping medium. Distance about 240 miles; direction ? .**



THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. 618 Date February 22, 1929 Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	20:49:02	Seismic tremors
Second preliminary tremors began	20:54:50	from
Long waves began	20:57:35	20:49:03 to
Maximum	20:57:46	21:32:00
End of principal portion	21:14:00	
End of earthquake	21:42:00	
	mm.	mm.
Maximum amplitude	1.0	—
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum	20	
Magnification	55	

REMARKS: 100 K Bosch-Omeri instruments; damping medium. Distance about 2,500
miles; direction ?

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS



EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **619** Date **February 23**, 192**9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	Seismic tremors from 13:50: to 14:48:00.	
Second preliminary tremors began	Artificial motion superimposed upon record; seismic tremors indistinct and uncertain.	
Long waves began		
Maximum		
End of principal portion		
End of earthquake		
	mm.	mm.
Maximum amplitude		
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum	20	20
Magnification	35	35

REMARKS: **100 K Bosch-Omeri instruments; damping medium. Distance and direction ?**



THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **620** Date **February 25**, 192**9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began		
Second preliminary tremors began		
Long waves began	Record lost while sheets were being changed.	
Maximum		
End of principal portion		
End of earthquake		
	mm.	mm.
Maximum amplitude		
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum	20	20
Magnification	35	35

REMARKS: **100 K Bosch-Omori instruments; damping medium.**

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF METEOROLOGY AND HYDROGRAPHY

REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.

(AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)

Month March Year 1929

Latitude 8° 57' 39" north.

NS 100K

Longitude 79° 33' 29" west.

Magnification 35

Greenwich mean time midnight to midnight.

MR 73363

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	1:47:20		1:57:26		2:22:00		---		3:17:00		1.0	20	Distance about 5,600 miles with epi-center south of the Aleutian Islands.
8													
9	Seismic tremors from a distant disturbance from about 11:42 to 12:11. Distance and direction?												
10													
11	13:27:45		13:28:30		13:28:58		13:29:15		13:41:00		2.0	20	Distance about 500 miles; direction?
12													
13													
14													
15													
16													
17													
18													
19	20:57:22		20:59:54		21:00:26		---		21:17:00		0.5	20	Distance about 900 miles with epi-center in Pacific Ocean south of Guatemala.
20													
21	2:39:55		2:42:16?		2:43:06		---		3:06 ?		0.5	20	Distance about 825 miles with epi-center in Pacific Ocean south of Guatemala.
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
 SECTION OF METEOROLOGY AND HYDROGRAPHY
REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
 (AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)



Month March Year 1929

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

Greenwich mean time midnight to midnight.

MR 73363

DATE	P. T. COMMENCE		2D GROUP COMMENCE		L. W. COMMENCE		MAXIMUM		END		MAX. AMPLITUDE	PERIOD OF PENDULUM	REMARKS
	<i>h.</i>	<i>m.</i>	<i>h.</i>	<i>m.</i>	<i>h.</i>	<i>m.</i>	<i>h.</i>	<i>m.</i>	<i>h.</i>	<i>m.</i>	<i>mm.</i>	<i>sec.</i>	
1													
2													
3													
4													
5													
6													
7													
8	1:47:20		1:57:56		----		----	3:15:00		----		20	Distance about 5,600 miles with epi-center south of Aleutian Islands
9													
10													Seismic tremors from a distant disturbance 11:42 to 12:11. Distance and direction?
11													
12	13:27:45		13:28:38		13:29:03		13:29:03	13:58:00		1.0		20	Distance about 300 miles; direction?
13													
14													
15													
16													
17													
18													
19													
20	20:57:53							21:16:50		----		20	(See EW - 100K)
21													
22													
23	2:59:36							?				20	(See EW - 100K)
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



EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **621** Date **March 7**, 1929. Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	1:47:20	1:47:20
Second preliminary tremors began	1:57:26	1:57:36
Long waves began	2:22:00	—
Maximum	—	—
End of principal portion	2:42:00	—
End of earthquake	3:17:00	3:15:00
	mm.	mm.
Maximum amplitude	1.0	—
Average period of waves	S.	S.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum	20	20
Magnification	35	35

REMARKS: **100 K Bosch-Omeri instruments; damping medium. Distance about 5,600 miles. Epi-center in Pacific ocean south of the Aleutian Islands.**



THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **622** Date **March 9**, 192**9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began		
Second preliminary tremors began	Seismic tremors from a distant disturbance from	
Long waves began	about 11:42 to 12:11	
Maximum		
End of principal portion		
End of earthquake		
	mm.	mm.
Maximum amplitude		
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum	20	20
Magnification	35	35

REMARKS: **100 K Bosch-Omori instruments; damping medium. Distance and direction?**

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS



EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **623** Date **March 11**, 192⁹ Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	13:27:43	13:27:45
Second preliminary tremors began	13:28:30	13:28:38
Long waves began	13:28:58	13:29:03
Maximum	13:29:15	13:29:03
End of principal portion	13:31:52	13:29:45
End of earthquake	13:41:00	13:38:00
	mm.	mm.
Maximum amplitude	2.0	1.0
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum	20	20
Magnification	35	35

REMARKS: **100 K Bosch-Omeri instruments; damping medium. Distance about
300 miles; direction?**



THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **624** Date **March 19, 1929**, 192... Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	20:57:22	20:57:25
Second preliminary tremors began	20:59:54	
Long waves began	21:00:26	
Maximum	—	
End of principal portion	21:05:24	
End of earthquake	21:17:00	21:16:30 (?)
	mm.	mm.
Maximum amplitude	05	-
Average period of waves	S.	S.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum	20	20
Magnification	55	55

REMARKS: **100 K Bosch - Omori instruments; damping medium. Distance about 900 miles with epi-center in Pacific Ocean south of Guatemala.**

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. 625 Date March 28, 1928. Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	2:39:55	2:39:56
Second preliminary tremors began	2:43:16 ?	
Long waves began	2:43:00	
Maximum	---	
End of principal portion	2:52:44	
End of earthquake	3:00 ?	?
	mm.	mm.
Maximum amplitude	9.5	
Average period of waves		S.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum	30	30
Magnification	35	35

REMARKS: 100 E Bosch - Omori instruments; damping medium. Distance probably
about 625 miles with same general epi-center as quake No. 622.

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF METEOROLOGY AND HYDROGRAPHY

REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.

(AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)



Month April Year 1929

Latitude 8° 57' 39" north, **NS and EW - 100 K**

Longitude 79° 33' 29" west, **Magnification - 35**

Greenwich mean time midnight to midnight.

MR 73363

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													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													Slight tremors from local disturbance between 10:38:00 and 10:42:00. Distance and direction?
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

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **626** Date **April 23,** 192**9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 130° 23')			E-W COMPONENT (Azimuth 90° 07')		
	h.	m.	s.	h.	m.	s.
First preliminary tremors began						
Second preliminary tremors began						
Long waves began						
Maximum	Slight tremors from local disturbance between					
End of principal portion	10:38:00 and 10:42:00					
End of earthquake						
			mm.			mm.
Maximum amplitude						
Average period of waves			s.			s.
First preliminary tremors						
Second preliminary tremors						
Long waves						
Maximum						
End of principal portion						
End portion						
Period of pendulum						
Magnification						

REMARKS: **100-K- Bosch-Omori instruments; damping medium. Distance and direction ?**

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF METEOROLOGY AND HYDROGRAPHY

REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.

(AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)

International
Seismological
CentreMonth May Year 1929Latitude 8° 57' 39" north. **E.W. & N.S. - 100 K**

Longitude 79° 33' 29" west.

Magnification - 35

Greenwich mean time midnight to midnight.

MR 73363

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 0:46:00 and 0:49:00. Distance & Direction?
1													Slight tremors from local disturbance between 16:15:00 and 16:19:00. " "
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													Slight seismic tremors between 12:04:50 and 12:13:00. Distance & Direction?
26													Slight seismic tremors from distant disturbance from 22:46:00 on
27													26th to 0:20:00 on 27th. Distance & Direction?
28													
29													
30													Slight seismic tremors from distant disturbance between 9:37:00 and 10:58:00
31													Distance & Direction?

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

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **627** Date **May 1**, 192**9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')			E-W COMPONENT (Azimuth 90° 07')		
	h.	m.	s.	h.	m.	s.
First preliminary tremors began						
Second preliminary tremors began						
Long waves began Slight tremors from local disturbance						
Maximum between 0:45:00 and 0:49:00						
End of principal portion						
End of earthquake						
			mm.			mm.
Maximum amplitude						
Average period of waves			s.			s.
First preliminary tremors						
Second preliminary tremors						
Long waves						
Maximum						
End of principal portion						
End portion						
Period of pendulum						
Magnification						

REMARKS: **100-K Bosch Omori instruments, damping medium, Distance and direction?**



THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

628

May 1

9

Seismic Record No. _____ Date _____, 192____ Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')			E-W COMPONENT (Azimuth 90° 07')		
	h.	m.	s.	h.	m.	s.
First preliminary tremors began						
Second preliminary tremors began						
Long waves began						
Maximum	Slight seismic tremors from local disturbance					
End of principal portion	between 16:15:00 and 16:19:00					
End of earthquake						
Maximum amplitude			mm.			mm.
Average period of waves			s.			s.
First preliminary tremors						
Second preliminary tremors						
Long waves						
Maximum						
End of principal portion						
End portion						
Period of pendulum						
Magnification						

REMARKS: **100-K- Bosch Omori instruments; damping medium. Distance and direction?**



THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **629** Date **May 25,** 192**9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began		
Second preliminary tremors began		
Long waves began Slight seismic tremors between 12:04:00 and 12:13:00		
Maximum		
End of principal portion		
End of earthquake		
	mm.	mm.
Maximum amplitude		
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum		
Magnification		

REMARKS: **100-K-Bosch Omori instruments; damping medium. Distance and direction?**



THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **630** Date **May 26-27**, 192**9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began		
Second preliminary tremors began		
Long waves began	slight seismic tremors from distant disturbance	
Maximum	from 22:45:00 on 26th to 0:20:00 on 27th.	
End of principal portion		
End of earthquake		
	mm.	mm.
Maximum amplitude		
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum		
Magnification		

REMARKS: **100-K Bosch Cmeri instruments; damping medium. Distance and direction?**
(Note: this is a correction on Record No. 630 dated 27-29)

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS



EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **630** Date **May 27-28**, 192 **9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')			E-W COMPONENT (Azimuth 90° 07')		
	h.	m.	s.	h.	m.	s.
First preliminary tremors began						
Second preliminary tremors began						
Long waves began Slight seismic tremors from distant						
Maximum disturbance from 10:46:00 on 27th to 0:20:00						
End of principal portion on 28th.						
End of earthquake						
				mm.		mm.
Maximum amplitude						
Average period of waves				s.		s.
First preliminary tremors						
Second preliminary tremors						
Long waves						
Maximum						
End of principal portion						
End portion						
Period of pendulum						
Magnification						

REMARKS: **100-K- Bosch Omori instruments; damping medium.**

Distance and direction?



THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. 651 Date May 30, 1929 Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began.....		
Second preliminary tremors began.....		
Long waves began..... <u>Slight seismic tremors from distant disturbance between 9:37:00</u>		
Maximum..... <u>and 10:58:00.</u>		
End of principal portion.....		
End of earthquake.....		
	mm.	mm.
Maximum amplitude.....		
Average period of waves.....	s.	s.
First preliminary tremors.....		
Second preliminary tremors.....		
Long waves.....		
Maximum.....		
End of principal portion.....		
End portion.....		
Period of pendulum.....		
Magnification.....		

REMARKS: 100-K Bosch Omori instruments; damping medium. Distance and direction ?

.....
.....
.....
.....

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF METEOROLOGY AND HYDROGRAPHY

REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.

(AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)

Month JUNE Year 1929

Latitude 8° 57' 39" north.

NS - 100 E

Longitude 79° 33' 29" west.

Magnification - 35

Greenwich mean time midnight to midnight,

MR 73363

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													
12													
13													
14													
15													
16													Distance and direction?
17													Trace of New Zealand
18													quake reported by
19													press.
20													Distance 25 miles.
21	3:53:44		3:33:48		3:33:48		3:33:53		3:35:15		1.7	20	Direction? Felt by
22	3:55:39		3:55:43		3:55:43		3:55:46		3:56:31		0.5	20	local residents.
23													Same epi-center as
24													quake above
25													Distance 5000 miles ?
26													Direction South ?
27	12:59:16		13:05:48		13:08:33		13:10:09		14:35:00		1.5	20	Trace poorly defined
28													distance and direction
29													approximate
30													Distance and direction?
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 METEOROLOGY AND HYDROGRAPHY

REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.

(AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)

International
Seismological
CentreMonth JUNE Year 1929Latitude $8^{\circ} 57' 39''$ north.
Longitude $79^{\circ} 33' 29''$ west.

EW - 100 K

Magnification - 35

Greenwich mean time midnight to midnight.

MR 73363

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													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													Distance and direction?
17													Trace of New Zealand
18													quake reported by
19													press.
20													
21	3:33:46		3:33:50		3:33:50		3:33:54		3:35:10		2.2	20	Distance 25 miles.
22	3:55:41		3:55:45		3:55:45		3:55:52		3:56:36		0.5	20	Direction. Felt by local residents.
23													<u>SAME</u> epi-center as quake above.
24													
25													Distance 3000 miles ?
26													Direction South ?
27													Trace poorly defined
28	12:58:56		13:05:38		13:08:25		13:10:00		14:35:00		0.5	20	Distance and direction only approximate.
29													Distance and Direction?
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

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **632** Date **June 16 & 17**, 192**9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began		
Second preliminary tremors began		
Long waves began Slight seismic tremors from distant disturbance between		
Maximum 23:13:00 on 16th to 0:16:00 on 17th		
End of principal portion		
End of earthquake		
	mm.	mm.
Maximum amplitude		
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum		
Magnification		

REMARKS: **100-K-Bosch Omori instruments; damping medium. Distance and direction ?**
Tremors evidently from seismic disturbance in New Zealand Reported by press.

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF METEOROLOGY AND HYDROGRAPHY

International
Seismological
Centre

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **653** Date **June 21**, 192⁹ Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began.....	3:33:44	3:33:46
Second preliminary tremors began.....	3:33:48	3:33:50
Long waves began.....	3:33:48	3:33:50
Maximum.....	3:33:53	3:33:54
End of principal portion.....	3:34:04	3:34:06
End of earthquake.....	3:35:15	3:35:10
	mm.....	mm.....
Maximum amplitude.....	1.7	2.2
Average period of waves.....	s.....	s.....
First preliminary tremors.....	-	-
Second preliminary tremors.....	-	-
Long waves.....	-	-
Maximum.....	-	-
End of principal portion.....	-	-
End portion.....	-	-
Period of pendulum.....	20	20
Magnification.....	35	35

REMARKS: **100-K-Bosch-Omori instruments; damping medium. Distance about 25 miles, direction ? Shock felt by many local residents.**

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF METEOROLOGY AND HYDROGRAPHY

International
Seismological
Centre

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS.

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **634** Date **June 21,** 192**9**. Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began.....	3:55:39	3:55:41
Second preliminary tremors began.....	3:55:43	3:55:45
Long waves began.....	3:55:43	3:55:45
Maximum.....	3:55:46	3:55:52
End of principal portion.....	3:56:06	3:56:04
End of earthquake.....	3:56:31	3:56:36
.....	mm.....	mm.....
Maximum amplitude.....	0.5	0.5
Average period of waves.....	s.....	s.....
First preliminary tremors.....	--	--
Second preliminary tremors.....	--	--
Long waves.....	--	--
Maximum.....	--	--
End of principal portion.....	--	--
End portion.....	--	--
Period of pendulum.....	20	20
Magnification.....	10	10

REMARKS: **100-K Bosch Omori instruments; damping medium.**

Distance about 25 mile. Direction question.

Same epi-center as quake 633.



THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. 656 Date June 28, 1929 Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began.....		
Second preliminary tremors began.....		
Long waves began.....	<u>slight seismic tremors between 22:07:00 and 22:10:00</u>	
Maximum.....		
End of principal portion.....		
End of earthquake.....		
	mm.	mm.
Maximum amplitude.....		
Average period of waves.....	s.	s.
First preliminary tremors.....		
Second preliminary tremors.....		
Long waves.....		
Maximum.....		
End of principal portion.....		
End portion.....		
Period of pendulum.....		
Magnification.....		

REMARKS: 100-K Bosch Omori instruments; damping medium.

Distance and direction?

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



Month July Year 1929

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

NS - 100 K
Magnification 35

Greenwich mean time midnight to midnight.

MR 73363

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													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													

Distance & Direction ?
 Probably from quake in
 Aleutian Islands 6100
 miles distant

Slight tremors between 1:22:22 and 1:24:40

See EW-100K record

Slight seismic tremors from local disturbance between 13:13:00 & 13:16:00; same epicenter as above.

14:14:13 14:14:36 14:14:43 14:14:59 14:18:42 2.0

20 Distant disturbance 125 miles direction ?

Very slight tremors between 14:23:00 and 14:29:00

Same epicenter as above.

2:04:59 2:05:43 2:06:04 2:06:10 2:10:15 0.3

20 Distance 250 miles; direction ?

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF METEOROLOGY AND HYDROGRAPHY

REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.

(AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)

International
Seismological
CentreMonth July Year 1929Latitude $8^{\circ} 57' 39''$ north.

EW - 100-K

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

Magnification 35

Greenwich mean time midnight to midnight.

MR 73363

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.
1														
2														
3														
4														
5														
6														
7													Distance and direction ?	
8													Probably from quake in	
9													Aleutian Islands 6100	
10													miles distant.	
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21													Slight tremors from local disturbance from 13:13:00 to 13:16:00 Same epicenter as below	
22													Distance 170 miles, direc-	
23	1:22:22	1:22:52	1:23:01	1:23:04	1:24:40	0.2	20						tion ?	
24	14:14:14	14:14:36	14:14:44	14:15:00	14:18:40	1.8	20						Distance 125 mi. Direction	
25														Very slight tremors from 14:23:00 to 14:29:00 Same epicenter as above.
26														
27														
28														
29														
30	2:04:56	2:05:42	2:06:00	2:06:06	2:09:22	0.5	20						Distance 250 miles	
31													Direction ?	

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

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **837** Date **July 7**, 1929 Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')			E-W COMPONENT (Azimuth 90° 07')		
	h.	m.	s.	h.	m.	s.
First preliminary tremors began.....						
Second preliminary tremors began.....						
Long waves began..... Slight tremors from distant disturbance between						
Maximum.....	21:40:00 and 23:09:00					
End of principal portion.....						
End of earthquake.....						
				mm.		mm.
Maximum amplitude.....						
Average period of waves.....				s.		s.
First preliminary tremors.....						
Second preliminary tremors.....						
Long waves.....						
Maximum.....						
End of principal portion.....						
End portion.....						
Period of pendulum.....						
Magnification.....						

REMARKS: **100-K Bosch Omori instruments; damping medium.**

Distance and direction ?

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DEPARTMENT OF OPERATION AND MAINTENANCE

SECTION OF METEOROLOGY AND HYDROGRAPHY

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **638** Date **July 22, 1929**, 192... Greenwich mean time, midnight to midnight.



PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began.....	Slight tremors	1:22:22
Second preliminary tremors began.....	between	1:22:52
Long waves began.....	1:22:22 and	1:23:01
Maximum.....	1:24:40	1:23:04
End of principal portion.....		1:23:40
End of earthquake.....		1:24:40
	mm.	mm.
Maximum amplitude.....		0.2
Average period of waves.....	s.	s.
First preliminary tremors.....		
Second preliminary tremors.....		
Long waves.....		
Maximum.....		
End of principal portion.....		
End portion.....		
Period of pendulum.....	20	20
Magnification.....	35	35

REMARKS: **100-K Bosch Omori instruments; damping medium. Distance about 170 miles, direction?**

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **639** Date **July 22, 1929**, 192 Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began.....		
Second preliminary tremors began.....		
Long waves began.....	Slight seismic tremors from local disturbance between 13:13:00	
Maximum.....	and 13:16:00	
End of principal portion.....		
End of earthquake.....		
	mm.	mm.
Maximum amplitude.....		
Average period of waves.....	s.	s.
First preliminary tremors.....		
Second preliminary tremors.....		
Long waves.....		
Maximum.....		
End of principal portion.....		
End portion.....		
Period of pendulum.....		
Magnification.....		

REMARKS: **100-K-Bosch Omori instruments; damping medium. Distance and direction ? but probably same epi-center as quake 638.**



THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
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EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **640** Date **July 23**, 192**9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	14:14:13	14:14:14
Second preliminary tremors began	14:14:36	14:14:38
Long waves began	14:14:43	14:14:44
Maximum	14:14:59	14:15:00
End of principal portion	14:15:58	14:16:00
End of earthquake	14:18:42	14:18:40
	mm.	mm.
Maximum amplitude	2.0	1.8
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum	20	20
Magnification	35	35

REMARKS: **100 - K Bosch Omori instruments, damping medium. Distance about
125 miles, direction?**



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DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. 641 Date July 25, 1929 Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')			E-W COMPONENT (Azimuth 90° 07')		
	h.	m.	s.	h.	m.	s.
First preliminary tremors began.....						
Second preliminary tremors began.....						
Long waves began.....	<u>Very slight seismic tremors from local</u>					
Maximum.....	<u>disturbance between 14:23 and 14:29.</u>					
End of principal portion.....						
End of earthquake.....						
			mm.			mm.
Maximum amplitude.....						
Average period of waves.....			s.			s.
First preliminary tremors.....						
Second preliminary tremors.....						
Long waves.....						
Maximum.....						
End of principal portion.....						
End portion.....						
Period of pendulum.....						
Magnification.....						

REMARKS: 100-K- Bosch Omori instruments; damping medium; Distance and
direction? but probably same epicenter as quake No. 640.

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS



EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. 642 Date July 30, 1929 192 Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	2:04:59	2:04:56
Second preliminary tremors began	2:05:43	2:05:42
Long waves began	2:06:04	2:06:00
Maximum	2:06:10	2:06:06
End of principal portion	2:06:50	2:06:50
End of earthquake	2:10:15	2:09:22
	mm.	mm.
Maximum amplitude	0.3	0.5
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum	20	20
Magnification	35	35

REMARKS: 100-K-Bosch Omori instruments; damping medium. Distance about 250
miles, direction?

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF METEOROLOGY AND HYDROGRAPHY

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



Month August - Year 1929.

Latitude 8° 57' 39" north. **NS - 100 K**

Longitude 79° 33' 29" west.

Magnification - 35.

Greenwich mean time midnight to midnight.

MR 73363

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													Distance 150 miles? Direction? Trace poorly defined.
5													
6													
7													
8													
9													Distance & direction?
10													
11													
12													
13													
14													
15													Distance & direction?
16													Instrument out of order - See EW - 100K -
17													Distance & direction?
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
 SECTION OF METEOROLOGY AND HYDROGRAPHY
REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
 (AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)



Month August Year 1929.

Latitude 8° 57' 39" north.

EW - 100 K

Longitude 79° 33' 29" west.

Greenwich mean time midnight to midnight.

Magnification - 35

MR 73363

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	9:11:06		?		9:11:49		9:12:33		9:20:00		1.5	20	Distance 150 miles? Direction? Trace poorly defined.
5													
6													
7													
8													
9	Slight tremors from local disturbance. (B. 9:23:00 -E. 9:26:00)												Distance & direction?
10	(B. 10:02:00 -E. 10:05:00)												
11	(B. 10:18:00 -E. 10:21:00)												
12													
13													
14	Slight tremors from local disturbance from 11:16:00 to 11:18:00												Distance & direction?
15	19:57:38		19:58:30		19:58:56		19:59:20		20:25:00		32.0	20	Distance 300 miles- direction?
16													
17	Slight tremors from distant disturbance from 23:48:00 on 17th												Distance and direction?
18	to 0:12:00 on 18th.												
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
SECTION OF SURVEYS



EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39'' N.

Long. 79° 33' 29'' W.

Altitude of Station, 90.5 feet.

Seismic Record No. **645** Date **August 4, 1929.**, 192... Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	Slight	9:11:06
Second preliminary tremors began	tremors from	?
Long waves began	9:11:06	9:11:49
Maximum	to	9:12:35
End of principal portion	9:20:00	9:13:19
End of earthquake		9:20:00
	mm.	mm.
Maximum amplitude		1.5
Average period of waves	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum		20
Magnification		35

REMARKS: **100-K BoscA Omori instruments; damping medium. Distance about
150 miles? Direction? Trace poorly defined.**



THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. 644 Date August 9, 1929, 192... Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')			E-W COMPONENT (Azimuth 90° 07')		
	h.	m.	s.	h.	m.	s.
First preliminary tremors began						
Second preliminary tremors began						
Long waves began	slight seismic tremors from local disturbance;					
Maximum	beginning 9:23:00, ending 9:26:00					
End of principal portion	"	10:02:00,	"	10:05:00		
End of earthquake		10:18:00,	"	10:21:00		
				mm.		mm.
Maximum amplitude						
Average period of waves				s.		s.
First preliminary tremors						
Second preliminary tremors						
Long waves						
Maximum						
End of principal portion						
End portion						
Period of pendulum						
Magnification						

REMARKS: 100^{-K} Bosch Omori instruments; damping medium.
Distance and direction ?.

RM*sw



THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **645** Date **August 15, 1923** 192 Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')			E-W COMPONENT (Azimuth 90° 07')		
	h.	m.	s.	h.	m.	s.
First preliminary tremors began						
Second preliminary tremors began						
Long waves began	Slight seismic tremors from local disturbance					
Maximum	between 11:16:00 and 11:18:00.					
End of principal portion						
End of earthquake						
			mm.			mm.
Maximum amplitude						
Average period of waves			s.			s.
First preliminary tremors						
Second preliminary tremors						
Long waves						
Maximum						
End of principal portion						
End portion						
Period of pendulum						
Magnification						

REMARKS: **100-K Bosch Omori instruments; damping medium. Distance and direction ?.**



THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. 647 Date August 17-18, , 1929 Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began.....		
Second preliminary tremors began.....		
Long waves began.....	<u>Slight tremors from distant disturbance between</u>	
Maximum.....	<u>23:48:00 on 17th and 0:12:00 on 18th.</u>	
End of principal portion.....		
End of earthquake.....		
	mm.	mm.
Maximum amplitude.....		
Average period of waves.....	s.	s.
First preliminary tremors.....		
Second preliminary tremors.....		
Long waves.....		
Maximum.....		
End of principal portion.....		
End portion.....		
Period of pendulum.....		
Magnification.....		

REMARKS: 100-K Bosch Omori instruments; damping medium. Distance and
direction ?.

RM⁺sw

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS



EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **648** Date **September 17,** 192**9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')			E-W COMPONENT (Azimuth 90° 07')		
	h.	m.	s.	h.	m.	s.
First preliminary tremors began						
Second preliminary tremors began						
Long waves began	Slight tremors from distant disturbance between			19:28:00		
Maximum	and 20:21:00					
End of principal portion						
End of earthquake						
				mm.		mm.
Maximum amplitude						
Average period of waves				s.		s.
First preliminary tremors						
Second preliminary tremors						
Long waves						
Maximum						
End of principal portion						
End portion						
Period of pendulum						
Magnification						

REMARKS: **100 K Bosch - Onori instruments; damping. Distance and direction ?**

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF METEOROLOGY AND HYDROGRAPHY

REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.

(AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)

Month OCTOBER Year 1929Latitude 8° 57' 39" north. **NS & EW 100 K**
Longitude 79° 33' 29" west.

Greenwich mean time midnight to midnight.

Magnification 35

MR 73363

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													Slight tremors from distant disturbance 6:01 to 6:15; 8:23 to 8:38 Distance and direction
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													Trace too small to measure time or amplitude although shock was felt by several
19													Slight tremors from nearby disturbance at 2:36:20
20													
21													Slight tremors from distant disturbance 10:19:24 to 10:57:00 Epi-center in Chile near Antofagasta. Distance 2300 mil es.
22													
23													
24													
25													Slight tremors from nearby ^{nearby} disturbance 23:35:32 to 23:35:44 Too small to measure but evidently very close.
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

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. 649 Date October 6, 1929 Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')			E-W COMPONENT (Azimuth 90° 07')		
	h.	m.	s.	h.	m.	s.
First preliminary tremors began						
Second preliminary tremors began						
Long waves began						
Maximum	<u>Slight tremors from distant disturbance between 6:01:00 and</u>					
End of principal portion	<u>6:15:00 ; between 6:25:00 and 6:58:00</u>					
End of earthquake						
			mm.			mm.
Maximum amplitude						
Average period of waves			s.			s.
First preliminary tremors						
Second preliminary tremors						
Long waves						
Maximum						
End of principal portion						
End portion						
Period of pendulum						
Magnification						

REMARKS: 100 K Bosch Omori instruments; damping medium. Distance and direction?



THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **550** Date **October 18,** 1929 Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')			E-W COMPONENT (Azimuth 90° 07')		
	h.	m.	s.	h.	m.	s.
First preliminary tremors began.....						
Second preliminary tremors began.....						
Long waves began.....						
Maximum..... Very slight tremors from nearby disturbance at 2:56:20						
End of principal portion.....						
End of earthquake.....						
			mm.			mm.
Maximum amplitude.....						
Average period of waves.....			s.			s.
First preliminary tremors.....						
Second preliminary tremors.....						
Long waves.....						
Maximum.....						
End of principal portion.....						
End portion.....						
Period of pendulum.....						
Magnification.....						

REMARKS: **100 K Bosch Omori instruments; damping medium. Direction?**
Center of disturbance apparently within few miles of instruments. Trace on sheets too small to measure time or amplitude although shock was felt by several local residents. No blasts of any kind were fired in the vicinity at this time.



THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF METEOROLOGY AND HYDROGRAPHY

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. 651 Date October 19, 1929 Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')			E-W COMPONENT (Azimuth 90° 07')		
	h.	m.	s.	h.	m.	s.
First preliminary tremors began.....						
Second preliminary tremors began.....						
Long waves began.....						
Maximum..... <u>Seismic tremors from distant disturbance between 10:19:21 and</u>						
End of principal portion..... <u>10:57:00</u>						
End of earthquake.....						
			mm.			mm.
Maximum amplitude.....						
Average period of waves.....			s.			s.
First preliminary tremors.....						
Second preliminary tremors.....						
Long waves.....						
Maximum.....						
End of principal portion.....						
End portion.....						
Period of pendulum.....						
Magnification.....						

REMARKS: 100 K Bosch Omori instruments; damping medium. Trace poorly defined
Press reports quake near Antofagasta, Chile approximately 2300 miles distant,
direction South.

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE

SECTION OF METEOROLOGY AND HYDROGRAPHY

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

 Seismic Record No. **652** Date **October 24**, 1929. Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')			E-W COMPONENT (Azimuth 90° 07')		
	h.	m.	s.	h.	m.	s.
First preliminary tremors began.....						
Second preliminary tremors began.....						
Long waves began.....						
Maximum..... Slight tremors from nearby disturbance between						
End of principal portion..... 23:35:32 and 23:35:44						
End of earthquake.....						
				mm.		mm.
Maximum amplitude.....						
Average period of waves.....				s.		s.
First preliminary tremors.....						
Second preliminary tremors.....						
Long waves.....						
Maximum.....						
End of principal portion.....						
End portion.....						
Period of pendulum.....						
Magnification.....						

 REMARKS: **100 K Bosch Omori instruments; damping medium. Distance and direction**
uncertain but appears to be from same epi-center as quake No. 650

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF METEOROLOGY AND HYDROGRAPHYREGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
(AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)Month NOVEMBER Year 1929Latitude $8^{\circ} 57' 39''$ north.**NS 100 K**Longitude $79^{\circ} 33' 29''$ west.**Magnification 35**

Greenwich mean time midnight to midnight.

MR 73363

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	5:21:57		5:25:01		--		--		5:40:00		--	20	Distance 850 miles? Direction? Trace in- distinct. Phases un- certain.
10													
11													
12													
13													
14													
15													
16	Very slight tremors from distant disturbance 19:30:00 to 20:30:00												Distance and direction?
17													
18													
19	20:39:44		20:45:56		20:48:59		--		21:38:00		0.4	20	Distance 2750 miles Direction North. Epi- center in Gulf of St. Lawrence near Nova S, Scotia.
20													
21													
22													
23													
24													
25													
26													
27													
28	2:17:08		2:17:17		2:17:21		2:17:17		2:18:00		3.0	20	Distance 45 miles, direction? Felt by a few local residents
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 METEOROLOGY AND HYDROGRAPHY

REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.

(AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)

Month NOVEMBER Year 1929Latitude 8° 57' 39" north.
Longitude 79° 33' 29" west.**EW 100 K**
Magnification 35

Greenwich mean time midnight to midnight.

MR 73363

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	5:22:35		5:24:59		--		--		3:40:00		--	20	Distance 850 miles? Direction? Trace in- distinct. Phases uncertain.
9													
10													
11													
12													
13													
14													
15	Very slight tremors from distant disturbance 19:30:00 to 20:30:00 Distance and direction												
16													?
17													Distance 2750 miles Direction North. Epi- center in Gulf of St. Lawrence near Nova Scotia.
18	20:40:00		20:46:16		20:48:48		--		21:58:00		0.2	20	
19													
20													
21													
22													
23													
24													
25													
26													
27	2:17:08		2:17:17		2:17:20		2:17:21		2:18:10		1.2	20	Distance 45 miles, direction? Felt by a few local residents.
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 METEOROLOGY AND HYDROGRAPHY

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. 653 Date November 8, 1929 Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began.....	3:23:37	3:22:28
Second preliminary tremors began.....	3:25:01	3:24:59
Long waves began.....	?	?
Maximum.....	?	?
End of principal portion.....	?	?
End of earthquake.....	3:40:00	3:40:00
	mm.	mm.
Maximum amplitude.....		
Average period of waves.....	s.	s.
First preliminary tremors.....		
Second preliminary tremors.....		
Long waves.....		
Maximum.....		
End of principal portion.....		
End portion.....		
Period of pendulum.....	20	20
Magnification.....	35	35

REMARKS: 100 K Bosch Omori instruments; damping medium. Distance 850 miles ?
direction ? (Trace too indistinct to be certain of phases)



THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE

SECTION OF METEOROLOGY AND HYDROGRAPHY

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. 654 Date November 15, 1929 Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began.....		
Second preliminary tremors began.....		
Long waves began.....		
Maximum..... <u>Very slight tremors from distant disturbance from 19:50:00</u>		
End of principal portion..... <u>to 20:30:00</u>		
End of earthquake.....		
	mm.	mm.
Maximum amplitude.....		
Average period of waves.....	s.	s.
First preliminary tremors.....		
Second preliminary tremors.....		
Long waves.....		
Maximum.....		
End of principal portion.....		
End portion.....		
Period of pendulum.....		
Magnification.....		

REMARKS: 100 K Bosch Omori Instruments; damping medium. Distance and direction?
Trace very small and indistinct.



THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS

EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. 655 Date November 18, 1929 Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	20:39:44	20:40:00
Second preliminary tremors began	20:45:56	20:46:16
Long waves began	20:48:59	20:48:48
Maximum	— — —	— — —
End of principal portion	21:12:00	21:12:00
End of earthquake	21:38:00	21:38:00
	mm.	mm.
Maximum amplitude	0.4	0.2
Average period of waves	' s.	' s.
First preliminary tremors	—	—
Second preliminary tremors	5	4
Long waves	17	16
Maximum	17	16
End of principal portion	14	14
End portion	—	—
Period of pendulum	20	20
Magnification	55	35

REMARKS: 100 K Boscé Omori instruments; damping medium. Distance 2750 miles,
Directions North. Free evidently that of quake reported by press as having
its epi-center in Gulf of St. Lawrence near Nova Scotia.

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS



EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **656** Date **November 27,** 192**9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	2:17:08	2:17:08
Second preliminary tremors began	2:17:17	2:17:17
Long waves began	2:17:21	2:17:20
Maximum	2:17:17	2:17:21
End of principal portion	2:17:36	2:17:36
End of earthquake	2:18:08	2:18:10
	mm.	mm.
Maximum amplitude	3.0	1.2
Average period of waves	/	/
	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum	20	20
Magnification	35	35

REMARKS: **100 K Boscé Omori instruments; damping medium. Distance 45 miles direction ?**

Felt by a few local residents.

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF METEOROLOGY AND HYDROGRAPHY

REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.

(AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)



Month DECEMBER Year 1929

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

NS - 100K

Magnification - 35

Greenwich mean time midnight to midnight.

MR 73363

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													
12													
13													
14													
15													
16	0:49:14	- - -	0:49:42	0:49:49	0:51:50					0.2	20		Distance 100 Miles/ Direction?
17	11:10:00	- - -	- - -	11:57:20	12:45:00					1.4	20		Epi-center in Aleutian Islands.
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
 SECTION OF METEOROLOGY AND HYDROGRAPHY
REGISTER OF EARTHQUAKES AT BALBOA HEIGHTS, C. Z.
 (AS RECORDED BY BOSCH-OMORI SEISMOGRAPH)



Month **DECEMBER** Year **1929**

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

B W - 100 K

Greenwich mean time midnight to midnight,

Magnification - 35

MR 73363

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													
12													
13													
14													
15													
16													
17		0:49:15	-	-	0:49:43		0:49:49		0:51:51		0.9	20	Distance 100 miles Direction ?
18		11:12:00	-	-	-		12:05:32		12:45:00		0.9	20	Epi-center in Aleutian Islands.
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
SECTION OF SURVEYS



EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **557** Date **December 16, 1929** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	0:49:14	0:49:15
Second preliminary tremors began	— — —	— — —
Long waves began	0:49:42	0:49:45
Maximum	0:49:49	0:49:49
End of principal portion	0:50:10	0:50:11
End of earthquake	0:51:50	0:51:51
	mm.	mm.
Maximum amplitude	0.2	0.9
Average period of waves	'	'
	s.	s.
First preliminary tremors		
Second preliminary tremors		
Long waves		
Maximum		
End of principal portion		
End portion		
Period of pendulum	20	20
Magnification	35	35

REMARKS: **100 K Bosch Omori instruments; damping medium. Distance 100 miles**

direction? Time uncertain; trace too small to measure secondary tremors.

THE PANAMA CANAL

DEPARTMENT OF OPERATION AND MAINTENANCE
SECTION OF SURVEYS



EARTHQUAKE REPORT

SEISMOGRAPH STATION, BALBOA HEIGHTS

Lat. 8° 57' 39" N.

Long. 79° 33' 29" W.

Altitude of Station, 90.5 feet.

Seismic Record No. **658** Date **December 17**, 192**9** Greenwich mean time, midnight to midnight.

PHASE	N-S COMPONENT (Azimuth 180° 23')	E-W COMPONENT (Azimuth 90° 07')
	h. m. s.	h. m. s.
First preliminary tremors began	11:10:00	11:12:00
Second preliminary tremors began	— — —	— — —
Long waves began	— — —	— — —
Maximum	11:57:20	12:05:32
End of principal portion	— — —	— — —
End of earthquake	12:45:00	12:45:00
	mm.	mm.
Maximum amplitude	1.4	0.9
Average period of waves	'	'
	s.	s.
First preliminary tremors	— — —	— — —
Second preliminary tremors	— — —	— — —
Long waves	-26 -	-20 -
Maximum	19	16
End of principal portion	— — —	— — —
End portion	— — —	— — —
Period of pendulum	20	20
Magnification	55	55

REMARKS: **100 K Bosch Geerl instruments; damping medium. Probably quake reported by press as having its epi-center in Aleutian Islands. Phases too indistinct to be certain.**