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SEISMOLOGICAL BULLETIN FOR 1928

JANUARY--JUNE

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INTRODUCTION

The following is the list of the official seismological stations equipped with seismographs as they existed on January 1, 1928. Moreover, all the meteorological stations official and coöperative, two hundred and fifty in number, have instructions to report about all perceptible earthquakes.

Name	Province	North latitude	East longitude	Equipment
Manila	Manila	14° 35'	120° 59'	Wiechert inverted pendulum, mass 1,000 Kg., two components. Vicentini microseismograph, mass 150 Kg., two components.
Baguio	Benguet	16° 25'	120° 35'	Omori horizontal pendulum, two components.
Ambulong	Batangas	14° 05'	121° 03'	Vicentini microseismograph, mass 100 Kg., two components.
Butuan	Agusan	8° 56'	125° 32'	Do.
Agaña	Guam	13° 24'	144° 38'	Wiechert inverted pendulum, mass 200 Kg., two components. Do.

The intensity of macroseisms is given in the notation known as the Rossi-Forel scale. The time of their occurrence is that indicated by the seismographs at the Central Observatory, whenever the disturbance has been recorded by them. This fact is denoted by an asterisk (*). Otherwise the time is that noted by the meteorological observers who report them. All time indications are in Greenwich mean time (midnight=0^h), insular time being added in brackets for the convenience of Philippine readers.

ROSSI-FOREL SCALE OF EARTHQUAKE INTENSITIES

- I. *Microseismic shock:* recorded by a single seismograph or by seismographs of the same model but not by several seismographs of different kinds; the shock felt by an experienced observer.
- II. *Extremely feeble shock:* recorded by several seismographs of different kinds; felt by small number of persons at rest.
- III. *Very feeble shock:* felt by several persons at rest; strong enough for the direction or duration to be appreciable.
- IV. *Feeble shock:* felt by persons in motion; disturbances of movable objects, doors, windows; creaking of ceilings.
- V. *Shock of moderate intensity:* felt generally by everyone; disturbance of furniture, beds, etc., ringing of swinging bells.
- VI. *Fairly strong shock:* general awakening of those asleep; general ringing of house bells; oscillation of chandeliers; stopping of pendulum clocks; visible agitation of trees and shrubs; some startled persons leave their dwellings.
- VII. *Strong shock:* overthrow of movable objects; fall of plaster; ringing of church bells; general panic, without damage to buildings.
- VIII. *Very strong shock:* fall of chimneys, cracks in walls of buildings.
- IX. *Extremely strong shock:* partial or total destruction of some buildings.
- X. *Shock of extreme intensity:* great disaster, buildings ruined, disturbance of the strata, fissures in the ground, rock-falls from mountains.

SEISMOLOGICAL BULLETIN FOR 1928

JANUARY, 1928

EARTHQUAKES FELT IN THE PHILIPPINES

5, 13^h 59^m 20^{s*} [5, 21^h 59^m 20^s]. Surigao (NE Mindanao). Light shock, intensity II-III. Distant origin in the Pacific ESE of Mindanao. Recorded in the Far East and Europe.

6, 4^h 10^m 14^{s*} [6, 12^h 10^m 14^s]. SE Mindanao. Earthquake shock felt with intensity III, in the Provinces of Davao and Agusan. Origin in the Pacific near parallel 6° N and meridian 127° E. Recorded in the Far East. At Butuan, Agusan, a light shock was felt at 9^h 30^m [17^h 30^m], but every likely it was of local origin not an aftershock.

7, 1^h 43^m 41^{s*} [7, 9^h 43^m 41^s]. SE Luzon. Earthquake felt with intensity III-IV in Catanduanes Island and through the Provinces of Albay and N Sorsogon. Origin to the east in the Pacific at about 13.5° N and 125° E.

8, 2^h 05^m 34^{s*} [8, 10^h 05^m 34^s]. SE Luzon and N Samar. Earthquake felt with intensity IV in Catanduanes and N Samar Islands and III in the provinces of Albay and Sorsogon. Origin the same of the preceding shock. Recorded at Hongkong. A very slight aftershock was noticed at 3^h 09^m 33^s [11^h 09^m 33^{s*}] in Catanduanes and Albay.

12, 10^h 33^m [12, 18^h 33^m]. Surigao (NE Mindanao). Light local shock, intensity III.

18, 18^h 56^m [19, 2^h 56^m]. Surigao (NE Mindanao). Earthquake felt with intensity III.

20, 18^h 36^m 08^{s*} [21, 2^h 36^m 08^s]. West of Luzon. Earthquake felt with intensity III-IV along the coast and mountain of Zambales. Origin in the China Sea at about 15.5° N and 119.4° E.

24, 2^h 00^m [24, 10^h 00^m]. Legaspi, Albay (SE Luzon). Local shock of intensity III.

27, 3^h 40^m [27, 11^h 40^m]. Sinait, Ilocos Sur (NW Luzon). Light shock of intensity II-III.

30, 11^h 54^m [30, 19^h 54^m]. Ormoc (W Leyte). Light local shock of intensity III.

31, 0^h 24^m [31, 8^h 24^m]. Calbayog (NW Samar). Light shock of intensity III.

RECORDS OF THE MICROSEISMOGRAPH

[Time: Greenwich mean. Midnight = 0^h. Instrument: Wiechert seismograph; 1,000 kilograms. $A_N: T_0 = 6.58, \epsilon = 2.288, \frac{r}{T_0^2} = 0.039$, $V = 198$; $A_E: T_0 = 7.77, \epsilon = 1.487, \frac{r}{T_0^2} = 0.049, V = 198$. Alluvium. 2.40 meters above sea level]

No.	Date	Character	Phase	Hour	Period	Amplitude		Remarks
						A_N μ	A_E μ	
1	1	Iv	iPE	9 35 51	s.			Very small movements.
			iLE	9 36 36				
			F	9 43				
2	1	Ir	ePE	18 51 00				
			LE?	18 57 57				
			F	19 11				
3	4	Ir	ePN	21 31 54	12	12	16	
			iSN	21 36 44				
			iLN	21 39 35				
			M _{N1}	21 40 51				
			M _{N2}	21 44 47				
			F	22 59				
4	5	Ir	ePNE	13 59 20				Pacific.
			iLE	14 01 30				
			iLN	14 01 39				
			F	14 18				

Records of the Microseismograph—Continued



No.	Date	Character	Phase	Hour	Period	Amplitude		Remarks
						A_N μ	A_E μ	
5	6	Iv	ePE ePN iLN iLE M _N M _E F	h. 4 10 14 m. 4 10 17 s. 4 12 11 4 12 14 4 12 18 4 13 02 4 29	6	19	19	Southeastern part of Mindanao.
6	6	IIu	ePE ePN iPR1N iPRIE iSNE eLE eLN M _E M _N F	19 44 32 19 44 35 19 47 33 19 47 43 19 55 08 20 17 41 20 18 00 20 19 58 20 21 53 21 20	19	7	29	Eastern part of Africa.
7	7	Iv	ePE iLE F	1 43 41 1 44 27 1 56				SE Luzon.
8	7	Iv	ePN F	16 43 14 16 46				
9	8	Iv	ePNE iLNE F	2 05 34 2 06 32 2 30				SE Luzon, Pacific.
10	8	Iv	ePNE eLNE F	3 09 38 3 10 27 3 18				Do.
11	18	Iv	ePNE iLN F	7 49 16 7 49 54 8 01				
12	19	Iv	ePE F	11 03 05 11 05				
13	20	I	e F	6 51 6 59				Near Formosa. Trace only.
14	20	Iv	ePNE F	10 50 40 10 54				
15	20	IIv	ePNE iLNE M _N M _E F	18 36 08 18 36 30 18 36 54 18 37 15 18 45	3	97	71	China Sea, near western coast of Luzon.
16	23	Iv	ePNE F	20 36 01 20 38				
17	23	Iv	ePNE iLNE F	20 49 45 20 50 19 20 56				
18	26	Iv	ePNE F	4 50 18 4 53				
19	26	Ir	ePNE eLE F	18 56 02 19 05 40 19 54				
20	26	Ir	ePNE eLNE F	21 58 00 22 05 12 22 58				Sumatra.
21	27	Ir	ePNE iLN F	22 25 11 22 28 43 23 08				E coast of Formosa.
22	27 28	I	ePNE F	23 48 46 0 06				E coast of Formosa. Trace only.
23	30	Iv	ePNE iLN	3 26 52 3 28 02				
24	30	I	ME F	3 37 22 3 52				End overtaken by following earthquake.

FEBRUARY, 1928

2, 5^h 45^m [2, 13^h 45^m]. Talacogon, Agusan (E Mindanao). Slight shock, intensity III. Recorded at Butuan.

3, 20^h 05^m [4, 4^h 05^m]. Negros Island. Earthquake shock felt with intensity III in the Province of Oriental Negros and in the southern part of Occidental Negros. Origin near the southern coast of the island. A light repetition occurred on the 4th at 19^h 30^m felt also in the Siquijor Island.

6, 3^h 54^m 34^{s*} [6, 11^h 54^m 34^s]. Mindanao Island. Extensive earthquake felt through the whole Island of Mindanao, excepting in its W and NE ends. Its intensity reached grade VI and V in the SE and S regions of the island. Distant origin towards the NNE of Moluccas Islands. Recorded over the world.

6, 13^h 50^m [6, 21^h 50^m]. Negros Island. Earthquake shock felt with intensity III in the central part of Occidental Negros Province.

6, 20^h 25^m [7, 4^h 25^m]. E Mindanao. Earthquake felt with intensity III-IV in the southern part of the Agusan Valley. Recorded at Butuan; local origin.

6, 22^h 50^m 15^{s*} [7, 6^h 50^m 15^s]. Basco (Batanes Islands). Slight shock, intensity III.

7, 8^h 36^m 06^{s*} [7, 16^h 36^m 06^s]. SE Mindanao. Earthquake felt with intensity III in the Province of Davao. Origin in the Pacific, SE of Davao Gulf. Recorded at Batavia.

7, 19^h 56^m 12^{s*} [8, 3^h 56^m 12^s]. Negros Island. Earthquake of intensity III felt in Oriental Negros, Siquijor Island and S part of Cebu Island. Origin near the south coast of Negros Island.

8, 14^h 40^m [8, 22^h 40^m]. Himamaylan (Occidental Negros). Local shock of intensity III.

12, 4^h 04^m [12, 12^h 04^m]. Talacogon, Agusan (E Mindanao). Local shock of intensity III. Recorded at Butuan.

12, 8^h 07^m [12, 16^h 07^m]. Iba, Zambales (W Luzon). Local shock of intensity II-III.

13, 5^h 38^m 28^{s*} [13, 15^h 38^m 28^s]. Guam (Mariana Islands). Earthquake of intensity III-IV. Origin in the Pacific, some distance W of Guam. Recorded slightly around the globe.

23, 9^h 22^m 14^{s*} [23, 17^h 22^m 14^s]. SE Mindanao. Earthquake felt with intensity II-III in the Provinces of Davao and Agusan. Origin in the Pacific, SE of the island. Recorded in the Far East.

29, 23^h 10^m [March 1st. 7^h 10^m]. Bacon, Sorsogon (SE Luzon). Local, light shock of intensity III.

RECORDS OF THE MICROSEISMOGRAPH

[Time: Greenwich mean. Midnight=0^h. Instrument: Wiechert seismograph; 1,000 kilograms. $A_N: T_0 = 6.58$, $\epsilon = 2.288$, $\frac{r}{T_0^2} = 0.039$
 $V = 198$; $A_E: T_0 = 7.77$, $\epsilon = 1.487$, $\frac{r}{T_0^2} = 0.049$, $V = 198$. Alluvium. 2.40 meters above sea level]



No.	Date	Character	Phase	Hour	Period	Amplitude		Remarks
						A_N μ	A_E μ	
25	3	Iu	ePNE	h. m. s. 13 57 30	s.			N Siberia. Very small movement. F from Omo- ri's seismograph.
			eLE	14 19 19				
			eLN	14 20 06				
			M _E	14 21 52	14		3	
			F	15 02				
26	4	I.	ePNE	6 14 52				Felt in the greatest part of Mindanno.
			iLN	6 22 35				
			iLE	6 22 50				
			M _N	6 25 17	11	15		
			M _E	6 25 32	10		10	
27	6	III _r	ePNE	3 54 34				Felt in the greatest part of Mindanno.
			iSE	3 58 17				
			iSN	3 58 22				
			iSRIE	3 58 32				
			iSRIN	3 58 37				
28	6	Ir	iLE	3 59 39				Bashi Channel.
			iLN	3 59 53				
			M _N	4 01 26	7	137		
			M _E	4 01 34	8		145	
			F	5 43				
29	7	II _r	ePNE	0 08 47				Near N Timor Island?
			iLN	0 16 25				
			iLE	0 16 53				
			M _E	0 17 32	13		20	
			M _N	0 19 14	13	8		
30	7	IV	F	1 28				Celebes Sea.
			iPNE	8 36 06				
			iLE	8 37 44				
31	7	IV	F	8 48				Near Oriental Negros Island.
			ePNE	19 56 12				
			iLN?	19 57 26				
32	11	IV	F	20 12				China Sea, near Western coast of Luzon.
			ePNE	7 50 37				
			iLNE	7 50 54				
33	11	IV	F	7 57				Trace only.
			ePNE	11 11 48				
			F	11 19				
34	12	IV	ePNE	6 37 11				—
			iLNE	6 37 28				
			F	6 43				
35	13	I	ePNE	4 59 31				Very small movements.
			F	5 07				
36	13	II _r	iPNE	5 38 28				Pacific, W of Guam Island.
			iSN	5 41 35				
			iSE	5 41 53				
			iLE	5 43 20				
			iLN	5 43 22				
37	13	Ir	F	6 32				Small movements.
			ePNE	16 40 21				
			eLNE?	16 44 18				
38	16	I	F	17 02				Trace only.
			e	21 50				
			F	22 05				
39	17	I	eE	12 45				Small movements. Microseisms, 8th to 17 th.
			F	13 11				
40	21	IV	ePNE	10 53 41				—
			F	10 56				
41	21	I	eNE	20 00 09				It masked by microseisms.
			F	20 06				

SEISMOLOGICAL BULLETIN FOR 1928

Records of the Microseismograph—Continued

9



No.	Date	Character	Phase	Hour	Period	Amplitude		Remarks
						A_N μ	A_E μ	
42	21	Iu	eNE	h. m. s.	s.			Initial phases very indefinite and disturbed by microseisms. Moderate microseisms, 18th to 21st.
			iLE	20 09 00				
			eLN	20 28 00				
			M _E	20 29 46				
			M _N	20 31 40	13		7	
			F	20 32 32	14	5		
43	23	IIv	ePNE	9 22 14				Pacific.
			iLE	9 23 48				
			iLN	9 23 50				
			M _N	9 24 10	3	53		
			M _E	9 24 29	4		46	
			F	9 44				
44	23	Ir	iPNF	19 07 00				Celebes Sea.
			iLN	19 09 38				
			iLE	19 09 44				
			F	19 29				
45	24	I	eLNE	14 48				Trace only.
			M _E	14 52 07	17			
			F	15 06			3	
46	25	I	ePNE	10 58 32				
			iLE	11 02 35				
			iLN	11 02 45				
			F	11 22				
47	25	I	ePNE	19 37 09				
			F	19 39				
48	26	Iu	eNE	1 40 00				Microseisms on the 22nd, 23rd, 24th, 25th and 26th.
			eLNE?	1 57 00				
			F	2 33				
49	29	I	eNE	22 09				Trace only.
			F	22 58				

MARCH, 1928

2, 18^h 35^m 00^{s*} [3, 2^h 35^m 00^s]. Surigao (NE Mindanao). Earthquake of intensity III. Near origin in the Pacific.

4, 5^h 20^m [4, 13^h 20^m]. Butuan, Agusan (N Mindanao). Very light local shock, intensity II-III.

12, 16^h 57^m 25^{s*} [13, 0^h 57^m 25^s]. Leyte and Cebu Islands. Earthquake felt with intensity VI-VII at Ormoc (W Leyte). This shock was the first of a series of shocks felt during the morning through northern Leyte and Cebu Islands. They occurred on the following local hours: 0^h 57^m 25^{s*}, 1^h 11^m 22^{s*}, 1^h 27^m, 2^h 14^m, 4^h 03^m 49^{s*} and 7^h 05^m. Only the first, second and fifth which had intensity IV-V at Ormoc were recorded at Manila. Their origin lay close to the NW coast of Leyte a little farther north of the place in the Ormoc Bay where have their origin the frequent local series of shocks which affect Ormoc and the nearest towns of the western coast of Leyte. All the shocks were felt through an extension comprising north Cebu and north Leyte within a radius of seventy kilometers from the origin. The first was lightly recorded in the nearest observatories of the Far East.

13, 5^h 10^m [13, 13^h 10^m]. Baguio, Benguet (W Luzon). Local shock of intensity II-III.

17, 9^h 26^m 49^{s*} [17, 17^h 26^m 49^s]. NE Mindanao and Leyte. Earthquake felt with intensity III in the northern part of the Provinces of Surigao and Agusan, Mindanao, and in the Island of Leyte. Distant origin to the east of Surigao in the Pacific.

17, 16^h 36^m [18, 0^h 36^m]. Ormoc (W Leyte). Local shock of intensity III.

18, 20^h 30^m [19, 4^h 30^m]. Bacon, Sorsogon (SE Luzon). Local shock of intensity III.

20, 18^h 34^m 08^{s*} [21, 2^h 34^m 08^s]. Baguio, Benguet (W Luzon). Earthquake shock, intensity III.

22, 20^h 53^m 27^{s*} [23, 4^h 53^m 27^s]. W Luzon. Extensive earthquake felt with intensity IV-V in Benguet and SE part of La Union Province. It was lightly felt in the neighboring Provinces of Tarlac, Pangasinan, Nueva Vizcaya, La Union, Amburayan, Ilocos Sur, Lepanto and Bontoc, and noticed by some few persons farther south and north of the said provinces. The origin lay near the boundary between the southern part of Benguet and La Union, at about 16.3° N and 120.5° E, in the Santo Tomas Mountain.

23, 20^h 13^m 47^{s*} [24, 4^h 13^m 47^s]. W Mindanao. Earthquake felt with intensity III-IV at Zamboanga and Basilan Island. Origin not far in the SE part of the Sulu Sea.

24, 22^h 03^m [25, 6^h 03^m]. Ormoc (W Leyte). Local shock of intensity III.

SEISMOLOGICAL BULLETIN FOR 1928

11

RECORDS OF THE MICROSEISMOGRAPH

[Time: Greenwich mean. Midnight=0^h. Instrument: Wiechert seismograph; 1,000 kilograms. $A_N: T_0=6.58, \epsilon=2.288, \frac{r}{T_0^2}=0.089$, $V=198; A_E: T_0=7.77, \epsilon=1.487, \frac{r}{T_0^2}=0.049, V=198$. Alluvium. 2.40 meters above sea level]



No.	Date	Character	Phase	Hour	Period	Amplitude		Remarks
						A_N μ	A_E μ	
50	2	Iv	iPNE F	h. m. s. 10 00 22 10 06	8.			
51	2	Iv	ePNE F	18 35 00 18 43				Pacific.
52	7	Ir	iPNE iSE iLE M _N M _E F	22 49 40 22 54 13 22 56 33 23 01 51 23 02 33 0 09				Kansu Province, China.
	8				11	10		
					12		13	
53	9	Ir	iPE iPN iSE iSN iLN iLE M _E M _N F	10 56 35 10 56 38 11 00 08 11 00 11 11 01 10 11 01 25 11 03 28 11 04 32 12 13				N Moluccas.
					6		14	
54	9	IIr	iPNE iPR1N iPR1E iPR2E PSE PSN iSE iSN iSR1N iSR1E iSR2N iSR2E iLE iLN M _{N1} M _{N2} F	18 12 35 18 14 11 18 14 16 18 14 56 18 17 51 18 18 08 18 18 48 18 18 53 18 22 14 18 22 16 18 23 10 18 23 42 18 25 25 18 26 00 18 31 12 18 34 28 20 35				Indian Ocean?
					15	46		
55	12	Iv	ePNE iLNE F	9 52 17 9 52 33 9 57				
56	12	IIv	ePNE iLNE M _E F	16 57 25 16 58 30 17 00 28 17 56		4	28	NW coast of Leyte.
57	12	Iv	ePNE	17 11 22				Aftershock of the preceding quake.
58	12	Iv	ePNE iLNE F	20 03 49 20 04 50 20 34				Aftershock of the No. 56.
59	13	IIr	ePNE iPR2N PSN iSE iSN iSR1E iLN iLE M _E M _N F	18 39 00 18 39 36 18 41 35 18 43 08 18 43 10 18 44 07 18 45 21 18 45 35 18 46 33 18 48 15 19 42		9	17	
60	13	I	ePNE F	22 44 54 22 56				Very small movements.
61	14	I	ePNE F	7 38 38 7 57				Trace only.
62	16	IIu	iPE iPN iPR1E iPR1N iPR2N iSNE iSR2N iSR2E iLNE M _E M _N FN FE	5 11 21 5 11 22 5 13 49 5 14 03 5 14 28 5 19 38 5 25 49 5 25 56 5 29 51 5 35 25 5 38 24 8 14 8 42		14	19	Pacific, near New Hebrides. Microseisms on the 13th, 14th, 15th and 16th.
					16	10		

Records of the Microseismograph—Continued



No.	Date	Character	Phase	Hour	Period	Amplitude		Remarks
						A_N μ	A_E μ	
63	16	Iv	ePNE iLNE F	h. 15 02 00 m. 15 03 04 s. 15 09	s.			
64	17	Iv	ePNE eLNE F	9 26 49 9 28 29 9 37				Slightly felt at Surigao.
65	18	I	ePNE F	3 13 00 3 41				Small movements.
66	18	I	ePNE F	12 15 08 12 33				Trace only.
67	20	Iv	ePNE eLNE F	18 34 08 18 34 28 18 36				Slightly felt at Baguio. Very samll movements.
68	22	Iu	ePNE iPR1E iPR2E eSE? eLE? M _E F	4 36 25 4 39 58 4 53 00 4 56 04 5 20 01 5 24 25 7 07	21		6	Pacific, Mexican coast.
69	22	IId	ePNE iLNE M _N M _E F	20 53 27 20 53 52 20 54 42 20 54 42 21 15		4	184	Benguet Province. Felt by some persons in Manila.
70	23	Iv	ePNE eLNE M _N M _E F	20 13 47 20 15 23 20 16 50 20 17 08 20 42	11	4		W Mindanao.
71	26	IIr	iPNE iSN iSE iLN iLE F	5 29 51 5 33 34 5 33 37 5 34 44 5 35 46 6 18				Moluccas.
72	26	Ir	ePNE iLE iLN F	6 46 47 6 53 51 6 53 53 7 31				Do.
73	26	Ir	ePNE iLN iLE F	8 09 44 8 15 00 8 15 51 9 02				Do.
74	26	Ir	ePNE iLNE	9 51 22 9 56 48				Moluccas. End overtaken by following quake.
75	26	Ir	ePNE F	10 13 20 10 31				Moluccas.
76	27	Ir	ePNE iLE F	14 42 51 14 47 18 15 05				
77	27	I	e F	19 18 19 41				Trace only.
78	28	I	e F	12 28 13 04				Do.
79	29	IIr	iPNE iSN iSE iLN iLE M _E M _N F	5 10 34 5 14 51 5 15 00 5 16 43 5 17 00 5 17 57 5 18 28 6 38	7	80		Near Japan.
80	29	Iv	ePNE iLNE F	13 29 23 13 29 42 13 34				

APRIL, 1928

5, 16^h 35^m [6, 0^h 35^m]. Ormoc (W Leyte). Local shock of intensity III-IV.

6, 2^h 34^m [6, 10^h 34^m]. Vigan, Ilocos Sur (NW Luzon). Local shock of intensity III.

7, 7^h 35^m 27^{s*} [7, 15^h 35^m 27^s]. Basco (Batanes Islands). Earthquake of intensity III. Origin some distance to the north of the island. Recorded at Hongkong, China, and Taihoku, Formosa.

8, 22^h 00^m [9, 6^h 00^m]. Lais, Davao (SE Mindanao). Local shock of intensity III.

9, 16^h 00^m [10, 0^h 00^m]. Ganassi, Lanao (W Mindanao). Local shock of intensity III.

10, 19^h 40^m [11, 3^h 40^m]. SW Mindanao. Earthquake felt with intensity IV at Malabang, S Lanao, and III at Cotabato. Origin in the northern part of Illana Bay.

13, 2^h 45^m [13, 10^h 45^m]. Dumaguete (Oriental Negros). Earthquake felt with intensity III. There occurred two repetitions of the same intensity at 11^h 11^m and 11^h 46^m (local time). Two days later on the 15th at 15^h 45^m a similar shock was noticed. The origin was located some distance to the WSW in the sea near the south coast of the island.

18, 10^h 04^m 15^{s*} [18, 18^h 04^m 15^s]. Talacogon, Agusan (E Mindanao). Earthquake felt with intensity III. Distant origin in the Pacific.

19, 14^h 27^m 51^{s*} [19, 22^h 27^m 51^s]. Baguio, Benguet (W Luzon). Earthquake felt with intensity III. Origin in southwestern part of the province, in the Santo Tomas Mountain; it was distinctly felt in the stations placed on W and NW foot of the said mountain. A light repetition was noticed at Baguio on the 20th at 7^h 53^m [15^h 53^m].

23, 6^h 34^m [23, 14^h 34^m]. Surigao (NE Mindanao). Local shock of intensity III.

24, 5^h 05^m [24, 13^h 05^m]. Naga, Camarines Sur (SE Luzon). Local shock of intensity III-IV. Very near origin.

27, 12^h 37^m 00^{s*} [27, 20^h 37^m 00^s]. SW Luzon. Earthquake felt with intensity III-IV in the Provinces of Cavite, W Batangas and very lightly in Manila, and in Bataan Province. Origin in China Sea.

27, 13^h 50^m 20^{s*} [27, 21^h 50^m 20^s]. Basco (Batanes Islands). Earthquake felt with intensity IV. Origin in the NE end of the China Sea at about 20° N and 120° E. Recorded at Hongkong, China, Taihoku, Formosa.

RECORDS OF THE MICROSEISMOGRAPH

[Time: Greenwich mean. Midnight=0^h. Instrument: Wiechert seismograph; 1,000 kilograms. $A_N: T_0=6.58, \epsilon=2.288, \frac{r}{T_0}=0.049$, $V=198$; $A_E: T_0=7.77, \epsilon=1.487, \frac{r}{T_0}=0.049$, $V=198$. Alluvium. 2.10 meters above sea level]



International
Seismological
Centre

No.	Date	Character	Phase	Hour			Period	Amplitude		Remarks
								A_N μ	A_E μ	
81	1	I	ePNE F	17 55 56						Small movements.
				18 34						
82	2	Iv	ePNE eLN F	19 31 38						
				19 33 43						
				19 47						
83	7	Iv	ePNE iLNE F	7 35 27						Bashi Channel.
				7 36 51						
				7 50						
84	9	Iu	ePE eSE eLE F	17 54 20						Peru.
				18 24 30						
				18 48 08						
				19 51						
85	10	Iv	ePNE LNE F	8 20 28						
				8 20 51						
				8 25						
86	10	Iv	ePNE iLE F	10 56 26						
				10 57 33						
				11 08						
87	11	I	eNE F	21 48 21						Trace only.
				22 02						
88	14	Iu	ePNE eSE eSN eLN eLE MN ME F	9 12 36						Bulgaria.
				9 22 51						
				9 23 46						
				8 45 00						
				9 45 19						
				9 52 42			18	3		
				9 54 00			18	5		
				11 19						
89	15	Iv	ePNE eLNE F	10 55 36						
				10 56 39						
				11 01						
90	16	I	ePNE F	8 18 35						Very small movements.
				8 36						
91	17	I	eNE F	3 09 48						Trace only.
				3 26						
92	17	I	eNE F	3 45 00						Felt in Mexico.
				4 16						
93	17	Iv	ePNE F	10 57 48						
				11 01						
94	18	Iv	ePNE F	10 04 15						
				10 14						
95	18	Iv	ePNE iLNE F	11 17 53						
				11 18 57						
				11 38						
96	18	Iv	ePNE eLNE F	11 52 53						
				11 54 10						
				12 11						
97	18	Iu	ePE ePN eSN eSE eLE eLN ME MN F	19 35 32						Bulgaria.
				19 35 33						
				19 47 20						
				19 47 22						
				20 08 10						
				20 08 16						
				20 11 41			30	4		
				20 13 32			31	3		
				21 12						
98	19	Iv	ePNE F	14 27 51						Western Luzon.
				14 34						
99	22	Iv	ePNE F	5 01 43						
				5 05						

SEISMOLOGICAL BULLETIN FOR 1928

Records of the Microseismograph—Continued



No.	Date	Character	Phase	Hour	Period	Amplitude		Remarks
						A_N μ	A_E μ	
100	22	Iv	ePNE F	h. m. s. 5 06 40 5 16	s.			
101	23	Iv	ePNE iLNE F	0 45 19 0 45 37 0 51				
102	24	Ir	ePNE eLNE F	19 47 42 19 53 36 20 34				
103	27	Iv	ePNE F	3 15 15 3 17				
104	27	IIId	iPNE iLNE F	12 37 00 12 37 18 12 54				SW Luzon; origin China Sea.
105	27	Iv	ePNE iLNE F	13 50 20 13 51 30 14 07				NE China Sea.
106	27	Iv	ePNE F	15 03 56 15 07				
107	27	I	eNE F	20 55 00 21 37				Trace only.

MAY, 1928

1, 14^h 21^m 55^{s*} [1, 22^h 21^m 55^s]. W Luzon. Earthquake felt with intensity III-IV in the Provinces of Benguet, Pangasinan, Tarlac and Zambales. Origin near the northern portion of the Zambales Mountain.

18, 12^h 57^m 45^{s*} [18, 20^h 57^m 45^s]. Legaspi, Albay (SE Luzon). Earthquake shock of intensity III. Near origin to the east in the sea.

21, 4^h 01^m 02^{s*} [21, 12^h 01^m 02^s]. W Luzon. Earthquake felt with intensity III in the Provinces of Ilocos Sur, La Union, Pangasinan, Benguet and N Tarlac. Origin in the China Sea, at about 16.5° N and 119.5° E.

28, 6^h 52^m 17^{s*} [28, 14^h 52^m 17^s]. E Mindanao. Light earthquake felt with intensity III at Lais, Davao, and II-III in some few places of Davao and Agusan Provinces. Origin somewhat distant in the Pacific. Recorded slightly in Europe.

28, 10^h 43^m [28, 19^h 43^m]. Yap (West Carolines). Earthquake shock of intensity III-IV, felt through the whole island.

31, 0^h 04^m [31, 8^h 04^m]. Taburan (NE Cebu). Local shock of intensity III.

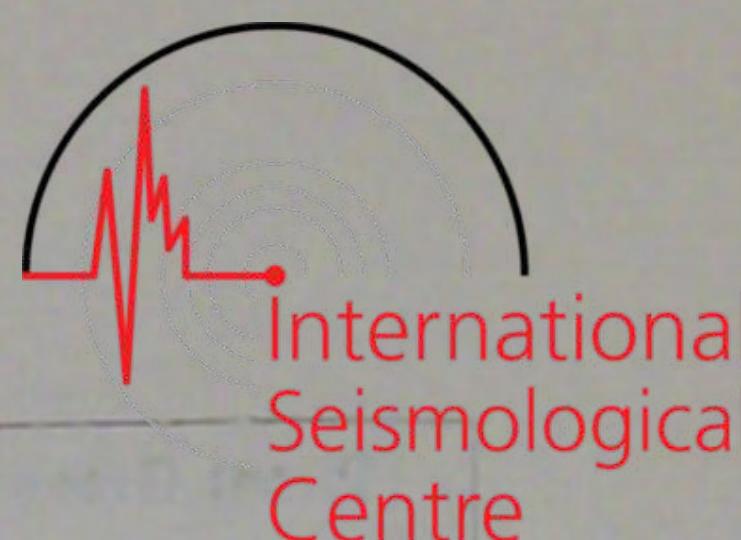
31, 8^h 25^m [31, 16^h 25^m]. Cotabato (SW Mindanao). Earthquake shock of intensity IV; regional origin. Recorded at Butuan.

RECORDS OF THE MICROSEISMOGRAPH



[Time: Greenwich mean. Midnight = 0^h. Instrument: Wiechert seismograph; 1,000 kilograms. A_N: T₀ = 6.58, ε = 2.288, $\frac{r}{T_{0.2}} = 0.031$, V = 198; A_E: T₀ = 7.77, ε = 1.487, $\frac{r}{T_{0.2}} = 0.049$, V = 198. Alluvium. 2.40 meters above sea level]

No.	Date	Character	Phase	Hour	Period	Amplitude		Remarks
						A _N μ	A _E μ	
108	1	I	eNE F	11 43 00 11 58	s.			Small movements.
109	1	IIv	iPNE iLNE M _N M _E F	14 21 55 14 22 14 14 22 17 14 22 17 14 35				Western Luzon.
110	1	I	eNE MNE F	19 12 00 19 35 00 19 57				
111	8	Iv	ePN iLN	4 58 40 4 59 17				End overtaken by the following earthquake.
112	8	Iv	ePN iLN F	5 01 29 5 02 09 5 06				Microseisms on the 6th, moderate on the 7th and strong on the 8th and 9th due to a typhoon over the Pacific.
113	9	Iv	ePNE F	1 38 43 1 41				
114	11	Iv	ePNE eLNE F	15 24 48 15 25 33 15 30				Microseisms on the 10th and 11th.
115	12	Iv	ePNE F	12 55 14 12 57				Light microseisms.
116	14	I	ePNE F	6 59 13 7 14				Small movements.
117	14	IIu	ePE ePN iPR ¹ E iPR ² E iPR ³ E SE SN LE LN M _E M _N F	22 34 46 22 34 48 22 36 09 22 37 31 22 42 33 22 50 28 22 50 43 23 28 52 23 29 00 23 33 45 23 35 32 1 03				Chachapoyas (Peru) and Ecuador.
118	15	Iv	ePNE F	2 56 16 3 10				
119	15	Iv	ePNE F	9 48 46 9 52				
120	17	Ir	ePNE iLNE F	10 59 05 11 01 34 11 32				NE Celebes Island.
121	18	Iv	ePNE F	12 57 45 13 03				Southeastern part of Luzon.
122	19	Ir	eNE eLNE F	9 38 45 9 44 00 10 04				
123	19	Iv	ePNE F	12 37 38 12 43				
124	20	Ir	ePNE eLNE F	16 34 29 16 41 20 17 03				Japan?
125	21	IIv	iPNE iLNE M _N M _E F	4 01 02 4 01 26 4 01 28 4 01 30 4 15		2 290 2 217		Western part of Luzon.
126	23	Iv	ePNE F	18 57 22 19 00				

Records of the Microseismograph—Continued

No.	Date	Character	Phase	Hour	Period	Amplitude		Remarks
						A_N μ	A_E μ	
127	23	Ir	ePNE	h. m. s.	s.			Near Moluccas.
			eLNE	20 59 24				
			F	21 03 13				
128	27	IIr	ePNE	9 56 52				Tuscarora Deep, off the coast of Japan.
			PSE	10 02 22				
			iSN	10 03 37				
			SE	10 03 43				
			iSR ² E	10 06 46				
			iSR ² N	10 07 26				
			iLN	10 10 22				
			iLE	10 10 23				
			M _E 1	10 12 53	18		33	
			M _N 1	10 12 56	16	25		
			M _N 2	10 14 40	15	24		
			M _E 2	10 15 36	14		60	
			F	12 24				
129	27	Iv	ePNE	18 30 59				
			eLNE	18 31 22				
			F	18 41				
130	28	I	ePNE	6 52 17				Small movements. Agusan Valley.
			F	7 29				
131	28	Iv	ePNE	15 02 36				Northwestern part of Luzon.
			F	15 07				
132	28	Iu	eNE	15 42 42				Tuscarora Deep, Aftershock.
			eLE	15 57 32				
			F	16 40				
133	31	I	eNE	7 34 00				Small movements.
			F	8 04				
134	31	Ir	ePNE	13 52 09				
			eLNE	13 56 35				
			F	14 55				
135	31	Ir	ePNE	20 57 05				
			iLNE	20 59 50				
			F	21 49				
136	31 June 1	I	eNE	23 38				Trace only.
			F	0 27				

JUNE, 1928

4, 2^h 55^m [4, 10^h 55^m]. Malita, Davao (SE Mindanao). Earthquake shock of intensity III. Recorded at Butuan. Origin to the SE of the Gulf of Davao.

5, 10^h 39^m [5, 18^h 39^m]. Calag-itam, Antique (SW Panay). Local shock of intensity III-IV.

5, 16^h 33^m [6, 2^h 33^m]. Guam (Mariana Islands). Earthquake of intensity III. Near origin to the SE of the island.

5, 19^h 35^m [6, 3^h 35^m]. Calag-itam, Antique (SW Panay). Local earthquake of intensity III-IV. Repetitions occurred on the following days 7, 10, 11 and 14 at 8^h 05^m, 7^h 55^m, 10^h 20^m, and 11^h 48^m (local time); possibly there were more numerous shocks of less intensity unnoticed by the people. It is not known what extension they had towards the east across the old eruptive mountain chain; certainly they were not noticed in the plains east of it. Their origin can not be located by observations of one single station, but it must be rather shallow. Similar swarms of shocks are not unknown in the place and single shocks of a like local character are frequent. The geology of the region is very little known; pliocene sedimentaries prevail in it, while to the east old eruptives are found in the mountain. The origin possibly lies in or near the contact of the eruptives with the pliocene sedimentaries.

14, 2^h 00^m [14, 10^h 00^m]. Janiuay, Iloilo (SE Panay). Local shock of intensity III.

14, 3^h 33^m 34^{s*} [14, 11^h 33^m 34^s]. NW Panay. Earthquake felt with intensity III-IV in the northern part of the Antique Province.

19, 11^h 00^m [19, 19^h 00^m]. Managok, Cotabato (SW Mindanao). Local shock of intensity III.

20, 16^h 12^m [21, 2^h 12^m]. Guam (Mariana Islands). Earthquake of intensity III. Origin close to the south of the island.

24, 20^h 34^m 20^{s*} [25, 4^h 34^m 20^s]. Negros and Panay Island. Earthquake felt with intensity III in the western part of Negros and SE of Panay. At 13^h 50^m (local time) a light repetition was felt only in western Negros. The origin was situated in the sea between southwestern Negros and southern Panay.

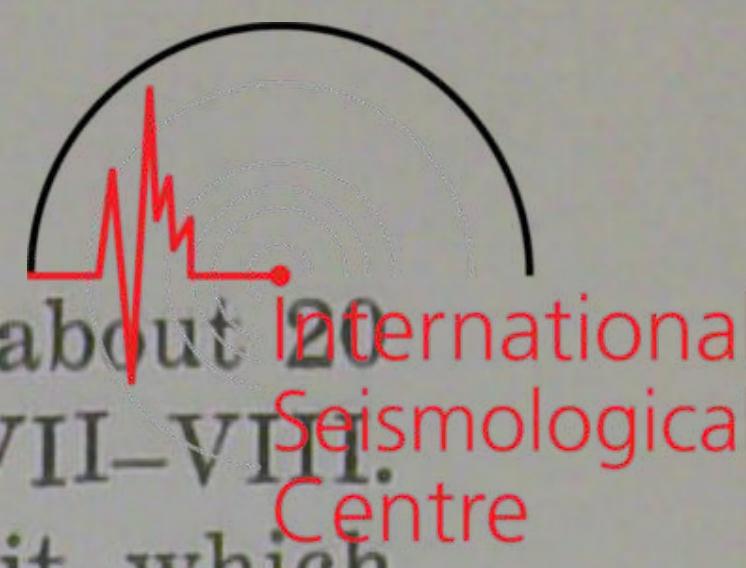
27, 1^h 33^m 00^{s*} [27, 9^h 33^m 00^s]. Basco (Batanes Islands). Earthquake shock felt with intensity III. Origin to the south in the Balingtang Channel. Recorded at Hongkong and Taihoku, Formosa.

28, 19^h 44^m [29, 3^h 44^m]. Ormoc (W Leyte). Earthquake shock of intensity IV-V; long duration. Recorded at Butuan.

30, 13^h 40^m [30, 23^h 40^m]. Guam (Mariana Islands). Earthquake of intensity III-IV.

THE MINDORO EARTHQUAKE

On the 15th of June at 6^h 13^m 12^{s*} [14^h 13^m 12^s] a destructive earthquake occurred in the southwestern end of the Island of Mindoro. A second earthquake as strong as the first took place at 17^h 16^m 45^{s*} [16, 1^h 16^m 45^s]. Aftershocks were almost continuous during the interval between the first and the second earthquake and very frequent on the 16th, 17th and 18th; on the 19th, 20th and 21st their frequency decreased rapidly, but during the afternoon and night of the 22nd they had an increase, which practically ended the seismic period.



Intensity of the earthquakes.—In the central area, which had an extension of about 20 kilometers along the coast in a NW direction, the shocks reached intensity VII-VIII. The destruction occurred chiefly on the seashore in a tongue-like portion of it which closes the small bay of Mangarin, forming a little port. On this ground were built a railway, running from a Sugar Central placed inland towards the NW, to the wharf at the end, and native houses occupied by laborers of the Central and fishermen. All this ground was strongly shaken and crevassed with complete destruction of the native light structures and considerable damage of a concrete warehouse, specially in the shore-side part of the railway. It seems that the ground slipped somewhat towards the sea and port, because it was warped, with subsidences and risings in different parts. Immediately after the shocks the sea invaded the shore flooding it permanently in sunken places, and washed down the loose earth of the embankment of the railway. Much dredging will be necessary around the wharf to obtain the former depth for steamers. Inland towards NW, in the Sugar Central, and N the damage was of small consideration.

Extension of the earthquakes.—The isoseism VI was about a hundred and sixty kilometers from the epicenter, and the limit of perceptibility, isoseism II-III, three hundred. Both principal earthquakes were recorded around the globe.

Epicenter.—The epicenter of the earthquake was at about 12.3° N and 121° E. Very likely in the sea but close to the coast. The origin of the shocks may have some relation to a deep through which from the China Sea runs southeastwards towards the southwest coast of Mindoro. Its continuation would cut the southern end of the island through the epicenter of the earthquakes. Geologically the meizoseismic area belong to the quaternary, piedmont and river formations. Opposite to the port of Mangarin, across a narrow channel, exist two small islands geologically recognized as tertiary. It is to be noted that the shock had on these islands remarkably much less intensity than in the quaternary soft formations at a distance of only about three kilometers, across the channel.

RECORDS OF THE MICROSEISMOGRAPH

[Time: Greenwich mean. Midnight=0^h. Instrument: Wiechert seismograph; 1,000 kilograms. $A_N: T_0=6.58, \epsilon=2.288, \frac{r}{T_0^2}=0.039$
 $V=198; A_E: T_0=7.77, \epsilon=1.487, \frac{r}{T_0^2}=0.049, V=198$. Alluvium. 2.40 meters above sea level]

No.	Date	Character	Phase	Hour	Period	Amplitude		Remarks
						A_N μ	A_E μ	
137	1	Ir	ePNE iLE F	h. m. s. 8 03 36 8 06 40 8 49	s.			Pacific, off SE Mindanao.
138	1	Iv	ePNE F	11 59 51 12 03				
139	1	Iu	ePNE iSN iSE eLN eLE M _N M _E F	13 18 47 13 26 11 13 26 14 13 34 00 13 34 22 13 36 36 13 37 44 14 48		15 16	7 6	Near Kuriles Islands.
140	2	IIv	ePNE iLNE F	8 49 57 8 50 36 9 11				
141	3	I	eNE F	3 01 29 3 26				Very small movements.

Records of the Microseismograph—Continued



No.	Date	Character	Phase	Hour	Period	Amplitude		Remarks
						A_N μ	A_E μ	
142	3	IIr	ePNE iLN iLE M _E M _N F	h. m. s. 8 35 17 8 44 00 8 44 43 8 46 02 8 47 11 10 09	s. ----- ----- 11 11 -----	----- ----- ----- 29 16 -----	Japan.	
143	3	I	ePNE F?	9 23 10	-----	-----	-----	Small movements.
144	4	IIv	ePNE iLNE F	14 30 06 14 30 41 14 41	----- ----- -----	-----	-----	
145	5	I	eNE F	5 59 17 6 29	-----	-----	-----	Trace only.
146	5	Iv	ePNE F	20 26 49 20 29	-----	-----	-----	
147	7	I	iLNE F	6 34 22 6 50	-----	-----	-----	
148	7	Iv	ePNE F	18 12 52 18 16	-----	-----	-----	
149	8	Iv	ePNE iLNE F	2 28 38 2 29 03 2 39	-----	-----	-----	
150	8	I	eNE F	14 50 44 15 33	-----	-----	-----	Small movements.
151	14	Iv	ePNE iLNE F	3 33 34 3 34 28 3 44	-----	-----	-----	NW Panay. Microseisms on the 12th, 13th, and 14th.
152	15	IIIId	iPNE iLNE	6 13 12 6 13 34	-----	-----	-----	SW Mindoro Island. Maxima and end lost by the force of the shock.
153	15	Iv	ePNE	6 53 12	-----	-----	-----	Aftershock.
154	15	Iv	ePNE	6 55 53	-----	-----	-----	Do.
155	15	Iv	ePNE	7 04 45	-----	-----	-----	Do.
156	15	IIv	iPNE F	7 19 30 7 25	-----	-----	-----	Do.
157	15	Iv	ePNE	7 27 58	-----	-----	-----	Do.
158	15	Iv	ePNE	7 42 06	-----	-----	-----	Do.
159	15	Iv	ePNE	8 29 57	-----	-----	-----	Do.
160	15	Iv	ePNE	8 49 03	-----	-----	-----	Do.
161	15	IIv	iPNE F	9 10 47 9 16	-----	-----	-----	Do.
162	15	Iv	ePNE	9 24 47	-----	-----	-----	Do.
163	15	Iv	ePNE	9 31 26	-----	-----	-----	Do.
164	15	Iv	ePNE	9 42 32	-----	-----	-----	Do.
165	15	Iv	ePNE	9 55 03	-----	-----	-----	Do.
166	15	Iv	ePNE	11 20 27	-----	-----	-----	Do.
167	15	Iv	ePNE	11 22 43	-----	-----	-----	Do.
168	15	Iv	ePNE	11 47 32	-----	-----	-----	Do.
169	15	Iv	ePNE	11 51 17	-----	-----	-----	Do.
170	15	IIv	iPNE F	12 11 08 12 15	-----	-----	-----	Do.
171	15	Iv	ePNE	13 28 02	-----	-----	-----	Do.
172	15	Iv	ePNE	14 53 41	-----	-----	-----	Do.
173	15	Iv	ePNE	14 56 47	-----	-----	-----	Do.
174	15	Iv	ePNE	16 48 35	-----	-----	-----	Do.

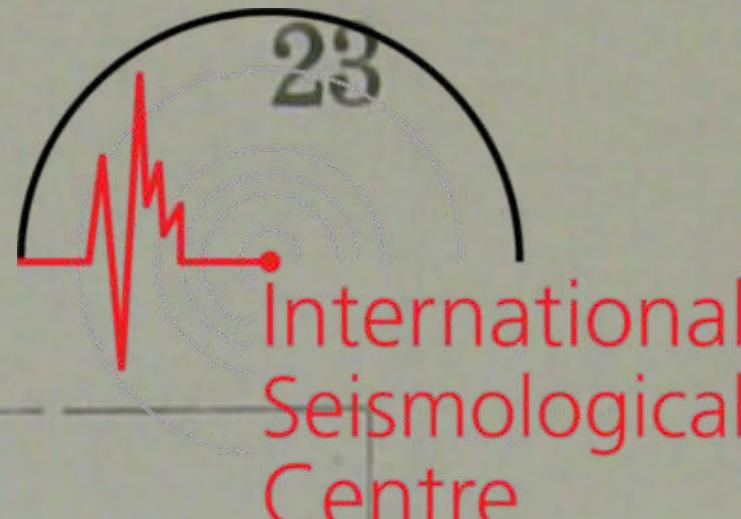
Records of the Microseismograph—Continued

No.	Date	Character	Phase	Hour	Period	Amplitude		Remarks
						A_N μ	A_E μ	
175	15	IIIId	iPNE F	h. 17 17	m. 16 47	s. 45		2nd earthquake of SW Mindoro Island.
176	15	Iv	iPNE	17	30	18		Aftershock.
177	15	IIv	iPNE	17	33	04		Do.
178	15	Iv	ePNE	17	55	11		Do.
179	15	Iv	ePNE	18	00	53		Do.
180	15	Iv	ePNE	18	37	41		Do.
181	15	Iv	ePNE	20	34	29		Do.
182	15	Iv	ePNE	21	24	28		Do.
183	15	Iv	ePNE	21	58	11		Do.
184	16	Iv	ePNE	1	06	35		Do.
185	16	IIv	ePNE F	6	27	09		Do.
186	16	Iv	ePNE	11	40	33		Do.
187	16	Iv	ePNE	15	00	13		Do.
188	16	IIv	ePNE F	15	37	08		Do.
189	16	I	ePNE F	18	33	42		
190	16	Iv	ePNE	19	38	39		Do.
191	17	Iu	ePNE eSN? eSE? eLNE F	3	39	00		Pacific, off Mexican coast.
192	17	I	iPNE	6	52	04		
193	17	Iv	ePNE	7	00	08		Aftershock.
194	17	Iv	ePNE	13	21	28		Do.
195	17	Iv	ePNE	17	21	58		Do.
196	17	Iv	ePNE	23	24	00		Do.
197	18	Iv	ePNE	6	31	45		Do.
198	18	Iv	ePNE	8	33	49		Do.
199	18	Iv	ePNE	9	54	00		Do.
200	18	Iv	ePNE F	13	08	01		
201	18	Iv	ePNE	13	16			
201	18	Iv	ePNE	15	30	10		Do.
202	18	Iv	ePNE	17	27	22		Do.
203	18	Ir	ePNE eLNE F	22	00	19		Near Moluccas.
204	19	Iv	ePNE	22	07	22		Aftershock.
205	19	I	eNE F	22	58			Small movements.
206	19	Iv	ePNE	8	29			
206	19	Iv	ePNE	9	05			
206	19	Iv	ePNE	21	00	00		Aftershock.
207	20	Iv	ePNE	1	57	54		Do.
208	20	Iv	ePNE	7	54	54		Do.
209	20	Iv	ePNE	13	55	00		Do.
210	21	Iu	ePNE eLNE F	10	51	20		Fiji Island.
				11	13	00		
				12	14			

SEISMOLOGICAL BULLETIN FOR 1928

23

Records of the Microseismograph—Continued



No.	Date	Character	Phase	Hour	Period	Amplitude		Remarks
						A_N	A_E	
211	21	Iu	eNE eLNE F	h. 16 39 33 m. 17 10 09 s. 18 20	s.			S coast of Alaska.
212	21	Iv	ePNE	23 58 21				Aftershock.
213	22	Iv	ePNE F	9 16 38 9 23				
214	22	Iv	ePNE	9 32 46				Do.
215	22	Iv	ePNE F	10 18 38 10 22				
216	22	Iv	ePNE	10 23 26				Do.
217	22	Iv	ePNE	13 33 09				Do.
218	22	Iv	ePNE	15 17 55				Do.
219	22	Iv	ePNE	16 54 31				Do.
220	22	Iv	ePNE	20 17 18				Do.
221	23	Iv	ePNE	1 44 43				Do.
222	23	Iv	ePNE	21 40 52				Do.
223	24	Ir	eNE F	4 43 29 5 01				
224	24	IIv	ePNE iLNE F	12 07 33 12 08 11 12 22				
225	24	I	eNE F	20 34 20 20 52				S of Guimaras Island.
226	25	Iv	ePNE eLNE F	5 58 06 5 58 54 6 10				
227	26	Iv	ePNE F	4 35 26 4 39				Aftershock.
228	27	Iv	ePNE iLNE F	1 33 00 1 33 59 1 50				S of Batanes Islands.
229	27	Iv	ePNE F	16 07 42 16 11				Aftershock.
230	28	Iv	ePNE F	4 43 30 4 50				
231	29	Iv	ePNE iLNE F	11 33 15 11 34 24 11 44				
232	29	IIr	iPNE iLNE F	19 42 48 19 45 44 20 53				
233	29	Iu	ePNE iLNE? F	22 59 34 23 14 00 0 42				
	30							

INTRODUCCIÓN

Damos en el texto inglés la lista de las estaciones sísmicas existentes en enero de 1928. Además todas las estaciones meteorológicas oficiales y voluntarias, cuyo número asciende a doscientas cincuenta, tienen las instrucciones necesarias para dar cuenta de todos los temblores perceptibles.

La intensidad de los terremotos se indica conforme a la conocida escala de Rossi-Forel. Cuanto a la hora en que tuvieron lugar, adoptamos la indicada por los sismógrafos de este Observatorio siempre que los hayan registrado, distinguiéndola por medio de un asterisco (*). En caso contrario copiamos la hora apuntada por los observadores que nos envían las notas. Todas las horas se refieren a la hora media de Greenwich (medianoche=0^h). Para conveniencia de los lectores de Filipinas se añade también la hora insular.

ESCALA DE INTENSIDADES DE ROSSI-FOREL

- I. *Tremor instrumental*: registrado tan sólo por los sismógrafos.
- II. *Tremor muy ligero*: sentido solamente por algunas personas en estado de reposo, especialmente en los pisos superiores de las casas, o por personas nerviosas y muy sensibles.
- III. *Tremor ligero*: sentido por varias personas en reposo; bastante fuerte para apreciar su dirección y duración.
- IV. *Tremor bien sensible*: sentido por muchas personas en movimiento.
- V. *Tremor de regular intensidad*: sentido generalmente por todos. Movimientos de muebles y otros objetos no muy pesados; grandes oscilaciones de objetos suspendidos.
- VI. *Tremor fuerte*: despiértanse los dormidos; tocan las pequeñas campanas; parada de relojes de péndulo; pánico y salida de las personas de sus viviendas.
- VII. *Tremor muy fuerte*: movimientos sentidos por todos; espanto general; todos se precipitan a la calle; caída de objetos y del yeso de las paredes; desperfectos en algunos edificios poco sólidos.
- VIII. *Tremor excesivamente fuerte, violento*: tocan las campanas, caen chimeneas, tejas de los techados, etc., daños de poca consideración en muchos edificios.
- IX. *Terremoto ruinoso*: ruina parcial de algunos edificios y desperfectos notables en los demás. Sin desgracias personales, fuera de algunos contusos y heridos.
- X. *Terremoto desastroso*: ruina total o casi total de muchos edificios y grandes desperfectos en los demás; víctimas numerosas. Grietas y hundimientos en el suelo y derrumbes en los montes.

ENERO, 1928

5, 13^h 59^m 20^{s*} [5, 21^h 59^m 20^s]. Surigao (NE de Mindanao). Ligero temblor de tierra de intensidad II-III. Origen lejano en el Pacífico, al ESE de Mindanao. Registrado en el Extremo Oriente y Europa.

6, 4^h 10^m 14^{s*} [6, 12^h 10^m 14^s]. SE de Mindanao. Temblor de tierra sentido con intensidad III en las provincias de Dávao y Agusan. Origen en el Pacífico cerca del paralelo 6° N y del meridiano 127° E. Registrado en el Extremo Oriente. En Butúan, Agusan, se sentió una ligera sacudida a 9^h 30^m [17^h 30^m], al parecer de origen local más bien que réplica.

7, 1^h 43^m 41^{s*} [7, 9^h 43^m 41^s]. SE de Luzón. Temblor de tierra sentido con intensidad III-IV en la isla de Catanduanes y en las provincias de Albay y Sorsogón. Origen hacia el E en el Pacífico, cerca de 13.5° N y 125° E.

8, 2^h 05^m 34^{s*} [8, 10^h 05^m 34^s]. SE de Luzón y N de Sámar. Temblor de tierra sentido con intensidad IV en la isla de Catanduanes y N de la de Sámar y en las provincias de Albay y Sorsogón. Del mismo origen que el precedente. Registrado en Hongkong. Notóse en Catanduanes y Albay una ligera réplica a 3^h 09^m 33^{s*} [11^h 09^m 33^s].

12, 10^h 33^m [12, 18^h 33^m]. Surigao (NE de Mindanao). Ligero temblor de intensidad III.

18, 18^h 56^m [19, 2^h 56^m]. Surigao (NE de Mindanao). Ligero temblor local de intensidad III.

20, 18^h 36^m 08^{s*} [21, 2^h 36^m 08^s]. W de Luzón. Temblor de tierra sentido con intensidad III-IV a lo largo de la costa y cordillera de Zambales. Origen en el mar de la China cerca de los 15.5° N y 119.4° E.

24, 2^h 00^m [24, 10^h 00^m]. Legaspi, Albay (SE de Luzón). Ligero temblor local de intensidad III.

27, 3^h 40^m [27, 11^h 40^m]. Sinait, Ilocos Sur (NW de Luzón). Ligero temblor de tierra local de intensidad II-III.

30, 11^h 54^m [30, 19^h 54^m]. Ormoc (W de Leyte). Ligera sacudida de intensidad III.

31, 0^h 24^m [31, 8^h 24^m]. Calbayog (NW de Sámar). Ligero temblor de intensidad III.

FEBRERO, 1928

2, 5^h 45^m [2, 13^h 45^m]. Talacogon, Agusan (E de Mindanao). Ligera sacudida de intensidad III. Registrada en Butúan.

3, 20^h 05^m [4, 4^h 05^m]. Isla de Negros. Temblor de tierra sentido con intensidad III en la parte sur de la isla en las dos provincias Occidental y Oriental. Origen en el mar cerca de la costa meridional. El mismo día 4 a 19^h 30^m ocurrió una ligera repetición sentida también en la vecina isla de Siquijor.

6, 3^h 54^m 34^{s*} [6, 11^h 54^m 34^s]. Isla de Mindanao. Extenso temblor de tierra sentido en toda la isla, excepto en sus extremos W y NE. Su intensidad fué de VI y V en la parte SE y S. Origen distante hacia el NNE de las islas Molucas. Registrado en todo el globo.

6, 13^h 50^m [6, 21^h 50^m]. Negros Occidental. Temblor de tierra sentido con intensidad III en la parte central de la Provincia.

6, 20^h 25^m [7, 4^h 25^m]. E de Mindanao. Temblor de tierra sentido con intensidad III-IV en la parte sur del valle y provincia del Agusan. Origen local; registrado en Butúan.

6, 22^h 50^m 15^{s*} [7, 6^h 50^m 15^s]. Basco (Islas Batanes). Ligero temblor de intensidad III.

7, 8^h 36^m 06^{s*} [7, 16^h 36^m 06^s]. SE de Mindanao. Temblor de tierra sentido con intensidad III en la provincia de Dávao. Origen en el Pacífico al SE del Golfo de Dávao. Registrado en Batavia.

7, 19^h 56^m 12^{s*} [8, 3^h 56^m 12^s]. Isla de Negros. Temblor de tierra sentido con intensidad III en la provincia de Negros Oriental, en la isla de Siquijor y en la parte sur de la de Cebú. Origen cerca de la costa sur de Negros.

8, 14^h 40^m [8, 22^h 40^m]. Himamaylan (Negros Occidental). Ligera sacudida local, de intensidad III.

12, 4^h 04^m [12, 12^h 04^m]. Talacogon, Agusan (E de Mindanao). Temblor de tierra local, de intensidad III; registrado en Butúan.

12, 8^h 07^m [12, 16^h 07^m]. Iba, Zambales (W de Luzón). Ligera sacudida local de intensidad II-III.

13, 5^h 38^m 28^{s*} [13, 15^h 38^m 28^s]. Guam (Islas Marianas). Temblor de tierra sentido con intensidad III-IV. Origen en el Pacífico al W de Guam. Registrado débilmente en todo el globo.

23, 9^h 22^m 14^{s*} [23, 17^h 22^m 14^s]. SE de Mindanao. Temblor de tierra sentido muy ligeramente, intensidad II-III, en las provincias de Dávao y Agusan. Origen en el Pacífico al SE de la isla. Registrado en el Extremo Oriente.

29, 23^h 10^m [Marzo 1, 7^h 10^m]. Bacon, Sorsogón (SE de Luzón). Temblor de tierra local de intensidad III.

MARZO, 1928

2, 18^h 35^m 00^{s*} [3, 2^h 35^m 00^s]. Surigao (NE de Mindanao). Temblor de tierra sentido con intensidad III. Origen cercano en el Pacífico.

4, 5^h 20^m [4, 13^h 20^m]. Butúan, Agusan (N de Mindanao). Ligerísimo temblor local, de intensidad II-III.

12, 16^h 57^m 25^{s*} [13, 0^h 57^m 25^s]. Isla de Leyte y Cebú. Temblor de tierra sentido con intensidad VI-VII en Ormoc, W de Leyte. Este temblor fué el primero de una serie de sacudidas sísmicas sentidas durante la mañana del 13. Fueron perceptibles en toda la isla de Leyte y en la parte norte de la de Cebú. Las horas locales de su ocurrencia fueron las siguientes: 0^h 57^m 25^{s*}, 1^h 11^m 22^{s*}, 1^h 27^m, 2^h 14^m, 4^h 03^m 49^{s*} y 7^h 05^m. Sólo la primera, segunda y quinta, que tuvieron intensidad IV-V en Ormoc, se registraron en Manila. El origen se hallaba cerca de la costa NW de la isla, algo al norte del conocido epicentro de la bahía de Ormoc, donde suelen originarse frecuentemente series de choques que afectan principalmente la región de Ormoc. Todas las sacudidas se sintieron dentro de un radio de 70 kilómetros que comprendía toda la parte norte de la isla de Leyte y norte de la de Cebú. El primero y principal temblor se registró también en los observatorios más cercanos del Extremo Oriente.

13, 5^h 10^m [13, 13^h 10^m]. Baguio, Benguet (W de Luzón). Temblor de tierra local de intensidad II-III.

17, 9^h 26^m 49^{s*} [17, 17^h 26^m 49^s]. NE de Mindanao e Isla de Leyte. Temblor de tierra sentido con intensidad III en la parte N de las provincias de Surigao y Agusan y en la isla de Leyte. Origen lejano al este de Surigao en el Pacífico.

17, 16^h 36^m [18, 0^h 36^m]. Ormoc (W de Leyte). Temblor de tierra local de intensidad III.

18, 20^h 30^m [19, 4^h 30^m]. Bacon, Sorsogón (SE de Luzón). Ligera sacudida local de intensidad III.

20, 18^h 34^m 08^{s*} [21, 2^h 34^m 08^s]. Baguio, Benguet (W de Luzón). Temblor local de intensidad III.

22, 20^h 53^m 27^{s*} [23, 4^h 53^m 27^s]. W de Luzón. Extenso temblor de tierra sentido con intensidad IV-V en Benguet y en la parte SE de la provincia de La Unión. Fué bien perceptible en las vecinas provincias de Pangasinán, Tarlac, Nueva Vizcaya, La Unión, Amburayan, Lepanto, Bontoc e Ilocos Sur, y notado por algunas personas a mayores distancias hacia el N y S de dichas provincias. El origen se hallaba en el límite entre la parte S de las provincias de Benguet y La Unión cerca del macizo de montañas del Santo Tomás hacia los 16.3° N y 120.5° E.

23, 20^h 13^m 47^{s*} [24, 4^h 13^m 47^s]. W de Mindanao. Temblor de tierra sentido con intensidad III-IV en Zamboanga y en la isla de Basilan. Origen cercano en la parte SE del mar de Jol6.

24, 22^h 03^m [25, 6^h 03^m]. Ormoc (W de Leyte). Sacudida local de intensidad III.

ABRIL, 1928

5, 16^h 35^m [6, 0^h 35^m]. Ormoc (W de Leyte). Temblor de tierra local de intensidad III-IV.

6, 2^h 34^m [6, 10^h 34^m]. Vigan, Ilocos Sur (NW de Luzón). Temblor de tierra local de intensidad III.

7, 7^h 35^m 27^{s*} [7, 15^h 35^m 27^s]. Basco (Isla Batanes). Temblor de tierra de intensidad III. Origen algo distante hacia el N de la isla. Registrado en Hongkong, China, y Taihoku, Formosa.

8, 22^h 00^m [9, 6^h 00^m]. Lais, Dávao (SE de Mindanao). Temblor de tierra local de intensidad III.

9, 16^h 00^m [10, 0^h 00^m]. Ganassi, Lánao (W de Mindanao). Temblor de tierra de intensidad III.

10, 19^h 40^m [11, 3^h 40^m]. SW de Mindanao. Temblor de tierra sentido con intensidad IV en Malabang, S de Lánao, y III en Cotabato. Origen en la parte N de la Bahía Illana.

13, 2^h 45^m [13, 10^h 45^m]. Dumaguete (Negros Oriental). Temblor de tierra de intensidad III. Ocurrieron dos repeticiones de la misma intensidad a 11^h 11^m y 11^h 46^m (hora local). Dos días después, el 15 a 15^h 45^m se sintió otra sacudida semejante. Su origen se hallaba algo distante cerca de la costa sur de la isla.

18, 10^h 04^m 15^{s*} [18, 18^h 04^m 15^s]. Talacogon, Agusan (E de Mindanao). Ligero temblor de tierra de intensidad III. Origen distante en el Pacífico.

19, 14^h 27^m 51^{s*} [19, 22^h 27^m 51^s]. Baguio, Benguet (W de Luzón). Temblor de tierra de intensidad III. Origen en la parte sudoeste de la provincia cerca de la montaña de Santo Tomás, fué también ligeramente perceptible en estaciones situadas al pie de la misma al W y NW. A 7^h 53^m [15^h 53^m] del 20 se notó en Baguio una ligera repetición.

23, 6^h 34^m [23, 14^h 34^m]. Surigao (NE de Mindanao). Sacudida local de intensidad III.

24, 5^h 05^m [24, 13^h 05^m]. Naga, Camarines Sur (SE de Luzón). Temblor de tierra de intensidad III-IV. Origen muy cercano.

27, 12^h 37^m 00^{s*} [27, 20^h 37^m 00^s]. SW de Luzón. Temblor de tierra sentido con intensidad III-IV en la provincia de Cavite y parte oeste de la de Batangas; perceptible también ligeramente en Manila y sus cercanías y en la provincia de Bataan. Origen en el mar de la China.

27, 13^h 50^m 20^{s*} [27, 21^h 50^m 20^s]. Basco (Isla Batanes). Temblor de tierra sentido con intensidad IV. Origen en la parte NE del mar de la China cerca de los 20° N y 120° E. Registrado también en Hongkong, China, y Taihoku, Formosa.

MAYO, 1928

1, 14^h 21^m 55^{s*} [1, 22^h 21^m 55^s]. W de Luzón. Temblor de tierra sentido con intensidad III-IV en las provincias de Pangasinán, Benguet, Tárlac y Zambales. Origen cerca de la parte norte de la cordillera de Zambales.

18, 12^h 57^m 45^{s*} [18, 20^h 57^m 45^s]. Legaspi, Albay (SE de Luzón). Temblor de tierra de intensidad III. Origen cercano hacia el E en el mar.

21, 4^h 01^m 02^{s*} [21, 12^h 01^m 02^s]. W de Luzón. Temblor de tierra sentido con intensidad III en las provincias de Ilocos Sur, La Unión, Pangasinán, Benguet y N de Tárlac. Origen en el mar de la China hacia los 16.5° N y 119.5° E.

28, 6^h 52^m 17^{s*} [28, 14^h 52^m 17^s]. E de Mindanao. Ligero temblor sentido con intensidad III en Lais, II-III en algunas otras estaciones de las provincias de Dávao y Agusan. Origen algo lejano en el Pacífico. Registrado débilmente en Europa.

28, 10^h 43^m [28, 19^h 43^m]. Yap (Carolinas Occidentales). Temblor de tierra sentido con intensidad III-IV en toda la isla.

31, 0^h 04^m [31, 8^h 04^m]. Taburan (NE de Cebú). Sacudida local de intensidad III.

31, 8^h 25^m [31, 16^h 25^m]. Cotabato (SW de Mindanao). Temblor de tierra de intensidad IV. Registrado en Butúan.

JUNIO, 1928

4, 2^h 55^m [4, 10^h 55^m]. Malita, Dávao (SE de Mindanao). Temblor de tierra de intensidad III. Registrado en Butúan. Origen al SE del golfo de Dávao.

5, 10^h 39^m [5, 18^h 39^m]. Calag-itán, Antique (SW de Panay). Sacudida local de intensidad III-IV.

5, 16^h 33^m [6, 2^h 33^m]. Guam (Islas Marianas). Temblor de tierra de intensidad III. Origen cercano al SE de la isla.

5, 19^h 35^m [6, 3^h 35^m]. Calag-itán, Antique (SW de Panay). Temblor de tierra de intensidad III-IV. Ocurrieron repeticiones de la misma intensidad los días siguientes 7, 10, 11 y 14 a las 8^h 05^m, 7^h 55^m, 10^h 20^m y 11^h 48^m respectivamente (hora local). Seguramente hubo otras muchas sacudidas menos perceptibles de que la gente no se dió cuenta. No consta qué extensión tuvieron hacia la cordillera que se halla a poca distancia al E por no existir en esa dirección estación ninguna hasta llegar a las llanuras del lado oriental de la misma donde nada se percibió. Tampoco es posible determinar su origen con los datos de una sola estación. Lo único cierto es que el ipocentro debe ser poco profundo y que en el mismo sitio suelen ser frecuentes semejantes series o enjambres de sacudidas. La geología de esta región es poco conocida, en general sus formaciones están representadas por rocas eruptivas antiguas a lo largo de la cordillera de Panay que corre casi de norte a sur a través de la isla; al oeste de ella donde está el epicentro de que tratamos predominan las sedimentarias del plioceno. Es posible que el origen se halle en el contacto entre las formaciones eruptivas y las sedimentarias.

14, 2^h 00^m [14, 10^h 00^m]. Janiuay, Iloílo (SE de Panay). Temblor de tierra local de intensidad III.

14, 3^h 33^m 34^{s*} [14, 11^h 33^m 34^s]. NW de Panay. Temblor de tierra sentido con intensidad III-IV en la parte N de la provincia de Antique.

19, 11^h 00^m [19, 19^h 00^m]. Managok, Cotabato (SW de Mindanao). Sacudida local de intensidad III.

20, 16^h 12^m [21, 2^h 12^m]. Guam (Islas Marianas). Temblor de tierra de intensidad III. Origen cerca del sur de la isla.

24, 20^h 34^m 20^{s*} [25, 4^h 34^m 20^s]. Islas de Negros y Panay. Temblor de tierra sentido con intensidad III en la parte central del oeste de Negros y en la sudeste de Panay. A los 13^h 50^m (hora local) ocurrió una ligera repetición advertida solamente en Negros. El origen se hallaba en el mar entre la parte sudoeste de Negros y sur de Panay.

27, 1^h 33^m 00^{s*} [27, 9^h 33^m 00^s]. Basco (Islas Batanes). Temblor de tierra de intensidad III. Origen hacia el sur en el canal de Balingtang. Registrado también en Hongkong, China, y en Taihoku, Formosa.

28, 19^h 44^m [29, 3^h 44^m]. Ormoc (W de Leyte). Temblor de tierra de intensidad IV-V. Registrado en Butúan.

30, 13^h 40^m [30, 23^h 40^m]. Guam (Islas Marianas). Temblor de tierra de intensidad III-IV.

EL TERREMOTO DE MINDORO

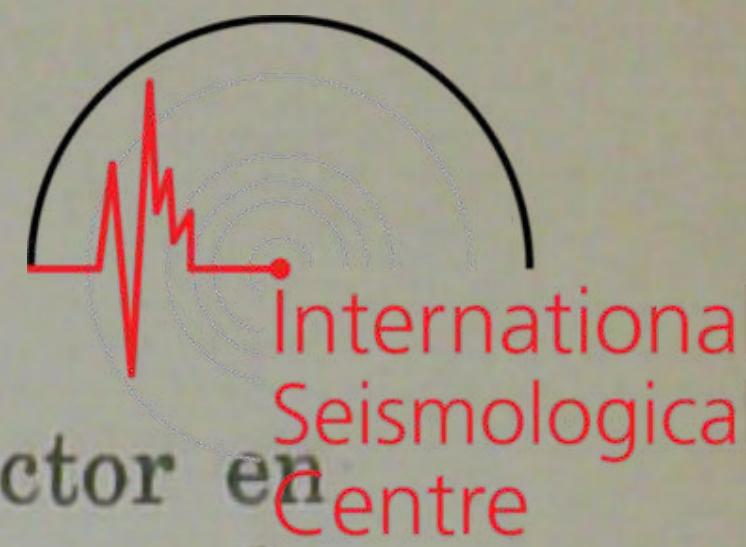
El 15 de junio a 6^h 13^m 12^{s*} [14^h 13^m 12^s] ocurrió un terremoto algo destructor en la parte SW de la isla de Mindoro; luego a 17^h 16^m 45^{s*} [16, 1^h 16^m 45^s] repitió con la misma intensidad. Las réplicas de varia intensidad fueron casi continuas durante el intervalo que medió entre uno y otro terremoto. Continuaron siendo frecuentes los días 16, 17 y 18; los días siguientes, 19, 20 y 21 su número decreció rápidamente, pero la noche del 21 al 22 hubo un recrudecimiento con el que prácticamente terminó este período sísmico.

Extensión e intensidad del terremoto.—El área central donde los dos terremotos llegaron a tener intensidad VII–VIII fué de una extensión muy limitada; no se extendió a más de 20 kilómetros en el puerto de Mangarin y a lo largo de la costa hacia el noroeste. La mayor destrucción tuvo lugar en un área casi triangular, uno de cuyos vértices se prolonga en forma de lengua que torciendo hacia la izquierda cierra una pequeña bahía la cual constituye el puerto de Mangarin. Esta lengua de tierra, sobre la cual pasa un pequeño tren para el muelle que está en su punta, varios almacenes y muchas casas de trabajadores de la Central Azucarera, algo distante hacia el NW y alejada de la playa, y pescadores, fué terriblemente sacudida y agrietada con destrucción de las estructuras en ella edificadas y del terraplén de la vía férrea; la destrucción fué más completa entre la vía férrea y el mar. Parece que realmente las sacudidas causaron un corrimiento del terreno hacia el mar y el puerto, puesto que quedaron la playa y el fondo del puerto ondulados, rellenados en varios puntos y hundidos en otros. A los terremotos siguió inmediatamente un avance del agua del mar que arrastró el agrietado terraplén de la vía férrea y dejó permanentemente inundadas las partes hundidas cerca de la playa. Alrededor del muelle será necesario buen dragado para obtener las antiguas profundidades. Tierra adentro donde está la Central, por ser el suelo más duro, los daños fueron de poca consideración.

La isosismia de intensidad VI se hallaba a cosa de 160 kilómetros de distancia del área central y el límite de perceptibilidad isosismia II–III a 300 kilómetros. Los dos terremotos fueron registrados alrededor del globo.

Epicentro.—El epicentro se hallaba cerca de los 12.3° N y 121° E, al parecer parte en el mar y parte en la costa. Posiblemente puede colocarse en la prolongación de un canal submarino que partiendo de las profundidades del mar de la China se prolonga en dirección SE hasta cerca de la costa SW de Mindoro. La prolongación de este canal atravesaría el extremo sur de Mindoro pasando por el epicentro.

La parte sudoeste de Mindoro donde ocurrieron los terremotos y todo su extremo sur pertenecen geológicamente al quaternario. Enfrente y al otro lado de un canal de unos 3 kilómetros de anchura existen unas pequeñas islas de formaciones terciarias; es de notar que en estas islas la intensidad de los terremotos fué muy notablemente menor.



Ref 2692.

Year 1928, No. 1.

January 1st to 7th, 1928.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.

$\phi=14^{\circ} 34' 41''$ N. $\lambda=120^{\circ} 58' 33''$ E. $h=2.40$ ms. Alluvium.

Instrument: Wiechert's astatic pendulum (1,000 Kg.)

		T_0	V	ϵ	$\frac{r}{T_0^2}$
	A_N	6.58	198	2.288	0.039
	A_E	7.77	198	1.487	0.049

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iод.	Amplitude A_N	Amplitude A_E	Dis-tance.	Remarks.
1	1	I _v	iPE iLE F	9 35 51 9 36 36 9 43				Km.	410
2	1	I _r	ePE LE? F	18 51 00 18 57 57 19 11					Very small Move-ments.
3	4	I _r	ePN iSN iLN MN1 MN2 F	21 31 54 21 36 44 21 39 35 21 40 51 21 44 47 22 59	12 10	12 16			
4	5	I _r	ePNE iLE iLN F	13 59 20 14 01 30 14 01 39 14 18				1150	Pacific.
5	6	I _v	ePE ePN iLN iLE MN ME F	4 10 14 4 10 17 4 12 11 4 12 14 4 12 18 4 13 02 4 29				930	Southeastern part of Mindanao.
6	6	II _u	ePE ePN iPR ¹ N iPR ¹ E iSNE eLE eLN ME MN F	19 44 32 19 44 35 19 47 33 19 47 43 19 55 08 20 17 41 20 18 00 20 19 58 20 21 53 21 20	6 19	19 29	7		
7	7	I _v	ePE iLE F	1 43 41 1 44 27 1 56				420	SE Luzon.
8	7	I _v	ePN F	16 43 14 16 46				130	

Year 1928, No. 2.

January 8th to 31st, 1928.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iod.	Amplitude A _N	A _E	Dis-tance.	Remarks.
				h. m. s.	s.) ⁴	⁴	Km.	
9	8	I _v	ePNE	2 05 34				530	SE Luzon.
			iLNE	2 06 32					
			F	2 30					
10	8	I _v	ePNE	3 09 33				490	SE Luzon.
			eLNE	3 10 27					
			F	3 18					
11	18	I _v	ePNE	7 49 16				340	
			iLN	7 49 54					
			F	8 01					
12	19	I _v	ePE	11 03 05				80	
			F	11 05					
13	20	I	e	6 51					Trace only.
			F	6 59					
14	20	I _v	ePNE	10 50 40				220	
			F	10 54					
15	20	II _v	ePNE	18 36 08				200	China Sea, near
			iLNE	18 36 30					western coast of
			MN	18 36 54	3	97			Luzon.
			ME	18 37 15	4		71		
			F	18 45					
16	23	I _v	ePNE	20 36 01				290	
			F	20 38					
17	23	I _v	ePNE	20 49 45				310	
			iLNE	20 50 19					
			F	20 56					
18	26	I _v	ePNE	4 50 18				170	
			F	4 53					
19	26	I _r	ePNE	18 56 02					
			eLE	19 05 40					
			F	19 54					
20	26	I _r	ePNE	21 58 00					
			eLN	22 09 19					
			eLE	22 10 14					
			F	22 58					
21	27	I _r	ePNE	22 25 11					
			iLE	22 29 49					
			iLN	22 30 03					
			F	23 08					
22	27	I	ePNE	23 48 46					Trace only.
28			F	0 06					
23	30	I _v	ePNE	3 26 52				640	End overtaken by
			iLN	3 28 02					following quake.
24	30	I	ME	3 37 22					
			F	3 52					

Year 1928, No. 3.

February 1st to 7th, 1928.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.

 $\phi=14^{\circ} 34' 41''$ N. $\lambda=120^{\circ} 58' 33''$ E. $h=2.40$ ms. Alluvium.

Instrument: Wiechert's astatic pendulum (1,000 Kg.)

	T_0	V	ϵ	$\frac{r}{T_0^2}$
A_N	6.58	198	2.288	0.039
A_E	7.77	198	1.487	0.049

No.	Date	Char- acter	Phase	Greenwich mean time	Per- iod.	Amplitude A_N	Amplitude A_E	Dis- tance.	Remarks.
				h. m. s.	s.	μ	μ	Km.	
25	3	I _u	ePNE	13 57 30					
			eLE	14 19 19					
			eLN	14 20 06					
			ME	14 21 52	14			3	
			F	15 02					
26	4	I _r	ePNE	6 14 52					
			iLN	6 22 35					
			iLE	6 22 50					
			MN	6 25 17	11		15		
			ME	6 25 32	10			10	
			F	7 25					
27	6	III _r	ePNE	3 54 34				2270	Felt in the east- ern and south- western part of Mindanao.
			iSE	3 58 17					
			iSN	3 58 22					
			iSRLE	3 58 32					
			iSRLN	3 58 37					
			iLE	3 59 39					
			iLN	3 59 53					
			MN	4 01 26	7	137			
			ME	4 01 34	8		145		
			F	5 43					
28	6	I _r	ePNE	22 50 15				680	Bashi Channel.
			iLNE	22 51 30					
			F	23 12					
29	7	II _r	ePNE	0 08 47				3240	Near Timor Island.
			iLN	0 16 25					
			iLE	0 16 53					
			ME	0 17 32	13		20		
			MN	0 19 14	13		8		
			F	1 28					
30	7	I _v	iPNE	8 36 06				900	Celebes Sea.
			iLE	8 37 44					
			F	8 48					

Year 1928, No. 4.

February 7th to 22nd, 1928.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char- acter	Phase	Greenwich mean time	Per- iod.	Amplitude A_N	Amplitude A_E	Dis- tance.	Remarks.
				h. m. s.	s.	μ	μ	Km.	
31	7	I _v	ePNE iLN? F	19 56 12 19 57 26 20 12				675	Near Oriental Negr gros Island.
32	11	I _v	ePNE iLNE F	7 50 37 7 50 54 7 57				150	China Sea, near western coast of Luzon.
33	11	I _v	ePNE F	11 11 48 11 19					Trace only.
34	12	I _v	ePNE iLNE F	6 37 11 6 37 28 6 43				150	
35	13	I	ePNE F	4 59 31 5 07					Very small move- ments.
36	13	II _r	iPNE iSN iSE iLE iLN F	5 38 28 5 41 35 5 41 53 5 43 20 5 43 22 6 32				1995	Pacific, W of Guam Island.
37	13	I _r	ePNE eLNE? F	16 40 21 16 44 18 17 02				1760?	Small movements.
38	16	I	e F	21 50 22 05					Trace only.
39	17	I	eE F	12 45 13 11					Small movements. Microseisms sin- ce 8th to 17th.
40	21	I _v	ePNE F	10 53 41 10 56				150	
41	21	I	eNE F	20 00 09 20 06					It masked by mi- croseisms.
42	21	I _u	eNE iLE eLN ME MN F	20 09 20 28 00 20 29 46 20 31 40 20 32 32 21 04	13 14	5	7		Initial phases very indefinite and disturbed by microseisms. Mo- derate microseisms since 18th to 21st.

Year 1928, No. 5.

February 23rd to 29th, 1928.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iod.	Amplitude A_N	Amplitude A_E	Dis-tance.	Remarks.
				h. m. s.	s.	μ	μ	Km.	
#3	23	II _V	ePNE	9 22 14					
			iLE	9 23 48					
			iLN	9 23 50					
			MN	9 24 10	3	53			
			ME	9 24 29	4		46		
			F	9 44					
44	23	I _r	iPNE	19 07 00				1210	Celebes Sea.
			iLN	19 09 38					
			iLE	19 09 44					
			F	19 29					
45	24	I	eLNE	14 48					Trace only.
			ME	14 52 07	17		3		
			F	15 06					
46	25	I	ePNE	10 58 32					
			iLE	11 02 35					
			iLN	11 02 45					
			F	11 22					
47	25	I	ePNE	19 37 09				50	
			F	19 39					
48	26	I _u	eNE	1 40 00					Microseisms on the
			eLNE?	1 57 00					22nd, 23rd, 24th,
			F	2 33					25th and 26th.
49	29	I	eNE	22 09					Trace only.
			F	22 58					

Year 1928, No. 6.

March 1st to 11th, 1928.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.

 $\phi=14^{\circ} 34' 41''$ N. $\lambda=120^{\circ} 58' 33''$ E. $h=2.40$ ms. Alluvium.

Instrument: Wiechert's astatic pendulum (1,000 Kg.)

	T_0	V	ε	$\frac{r}{T_0^2}$
A _N	6.58	198	2.288	0.039
A _E	7.77	198	1.487	0.049

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iod.	Amplitude A _N	A _E	Dis-tance.	Remarks.
50	2	I _v	iPNE	10 00 22					
			F	10 06					570
51	2	I _v	ePNE	18 35 00					
			F	18 43					550
52	7	I _r	iPNE	22 49 40					
			iSN	22 55 00					
			iSE	22 55 37					
			iLN	23 00 02					
			iLE	23 01 00					
			MN	23 01 51	11	10			
			ME	23 02 33	12		13		
	8		F	0 09					
53	9	I _r	iPE	10 56 35					
			IPN	10 56 38					
			iSE	11 00 08					
			iSN	11 00 11					
			iLN	11 01 10					
			iLE	11 01 25					
			ME	11 03 28	6		14		
			MN	11 04 32	8	10			
			F	12 13					
54	9	II _r	iPNE	18 12 35					
			iPR1N	18 14 11					
			iPR1E	18 14 16					
			iPR2E	18 14 56					
			PSE	18 17 51					
			PSN	18 18 08					
			iSE	18 18 48					
			iSN	18 18 53					
			iSR ¹ N	18 22 14					
			iSR ¹ E	18 22 16					
			iSR ² N	18 23 10					
			iSR ² E	18 23 42					
			iLE	18 25 25					
			iLN	18 26 00					
			MN1	18 31 12	15	46			
			MN2	18 34 28	13	76			
			F	20 35					

Year 1928, No. 7.

March 12th to 17th, 1928.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iod.	Amplitude AN	Amplitude AE	Dis-tance.	Remarks.
				h. m. s.	s.	N	μ	Km.	
55	12	I _v	ePNE iLNE F	9 52 17 9 52 33 9 57				140	
56	12	II _v	ePNE iLNE ME F	16 57 25 16 58 30 17 00 28 17 56	4		28	590	W Leyte.
57	12	I _v	ePNE	17 11 22					Aftershock of the preceding quake.
58	12 1	I _v	ePNE iLNE F	20 03 49 20 04 50 20 34				550	Aftershock of the No. 56.
59	13	II _r	ePNE iPR ² N PSN iSE iSN iSR ¹ E iLN iLE ME MN F	18 39 00 18 39 36 18 41 35 18 43 08 18 43 10 18 44 07 18 45 21 18 45 35 18 46 33 18 48 15 19 42				2730	
60	13	I	ePNE F	22 44 54 22 56					Very small move-ments.
61	14	I	ePNE F	7 38 38 7 57					Traces only.
62	16	II _u	iPE iPN iPR ¹ E iPR ¹ N iPR ² N iSNE iSR ² N iSR ² E iLNE ME MN FN FE	5 11 21 5 11 22 5 13 49 5 14 03 5 14 28 5 19 38 5 25 49 5 25 56 5 29 51 5 35 25 5 38 24 8 14 8 42	14 16	9 9	17 12	6540	Pacific, near New Hebrides. Microseisms on the 13th, 14th, 15th and 16th.
63	16	I _v	ePNE iLNE F	15 02 00 15 03 04 15 09				580	
64	17	I _v	ePNE eLNE F	9 26 49 9 28 29 9 37				920	Slightly felt at Surigao.

Year # 1928, No. 8.

March 18th to 26th, 1928.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iод.	Amplitude A _N	A _E	Dis-tance.	Remarks.
				h. m. s.	s.	Y	Y	Km.	
65	18	I	ePNE F	3 13 00 3 41					Small movements.
66	18	I	ePNE F	12 15 08 12 33					Traces only.
67	20	I _v	ePNE eLNE F	18 34 08 18 34 28 18 36				180	Slightly felt at Baguio. Very small movements.
68	22	I _u	ePNE iPR1E iPR2E eSE? eLE? ME F	4 36 25 4 39 58 4 53 00 4 56 04 5 20 01 5 24 25 7 07	21		6	13500?	
69	22	II _d	ePNE iLNE MN ME F	20 53 27 20 53 52 20 54 42 20 54 42 21 15	4	184	131	225	Benguet Province. Felt by some persons in Manila.
70	23	I _v	ePNE eLNE MN ME F	20 13 47 20 15 23 20 16 50 20 17 08 20 42	11	4	8	880	W Mindanao.
71	26	II _r	iPNE iSN iSE iLN iLE F	5 29 51 5 33 34 5 33 37 5 34 44 5 35 46 6 18				2370	Moluccas.
72	26	I _r	ePNE iLE iLN F	6 46 47 6 53 51 6 53 53 7 31				2930	Moluccas.
73	26	I _r	ePNE iLN iLE F	8 09 44 8 15 00 8 15 51 9 02				2490	Moluccas.
74	26	I _r	ePNE iLNE	9 51 22 9 56 48				2370	Moluccas. End overtaken by following earthquake.

Year 1928, No. 94

March 26th to April 8th, 1928.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iod.	Amplitude A_N	Amplitude A_E	Dis-tance.	Remarks
				h. m. s.	s.	μ	μ	Km.	
75	26	I _r	ePNE	10 13 20					
			F	10 31					
76	27	I _r	ePNE	14 42 51					1950
			iLE	14 47 18					
			F	15 05					
77	27	I	e	19 18					Traces only.
			F	19 41					
78	28	I	e	12 28					Traces only.
			F	13 04					
79	29	II _r	iPNE	5 10 34					
			iSN	5 14 51					
			iSE	5 15 00					
			iLN	5 16 43					
			iLE	5 17 00					
			ME	5 17 57	7				
			MN	5 18 28	7	48	80		
			F	6 38					
80	29	I _v	ePNE	13 29 23					170
			iLNE	13 29 42					
			F	13 34					

A P R I L , 1 9 2 8 .

81	1	I	ePNE	17 55 56					Small movements.
			F	18 34					
82	2	I _v	ePNE	19 31 38					960
			eLN	19 33 43					
			F	19 47					
83	7	I _v	ePNE	7 35 27					770
			iLNE	7 36 51					
			F	7 50					

Year 1928, No. 10.

April 9th to 18th, 1928.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time	Per-i od.	Amplitude A_N	Amplitude A_E	Dis-tance.	Remarks.
				h. m. s.	s.	μ	μ	Km.	
84	9	I _u	ePE eSE eLE F	17 54 20 18 24 30 18 48 08 19 51				12483	Peru.
85	10	I _v	ePNE LNE F	8 20 28 8 20 51 8 25				210	
86	10	I _v	ePNE iLE F	10 56 26 10 57 33 11 08				610	
87	11	I	eNE F	21 48 21 22 02					Traces only.
88	14	I _u	ePNE eSE eSN eLN eLE MN ME F	9 12 36 9 22 51 9 23 46 9 45 00 9 45 19 9 52 42 9 54 00 11 19	18 18	3	5	10530	Bulgaria.
89	15	I _v	ePNE eLNE F	10 55 36 10 56 30 11 01				490	
90	16	I	ePNE F	8 18 35 8 36					Very small move-ments.
91	17	I	eNE F	3 09 48 3 26					Traces only.
92	17	I	eNE F	3 45 00 4 16					Felt in Mexico.
93	17	I _v	ePNE F	10 57 46 11 01				125	
94	18	I _v	ePNE F	10 04 15 10 14					Felt slightly in Agusan Valley.
95	18	I _v	ePNE iLNE F	11 17 53 11 18 57 11 38				580	
96	18	I _v	ePNE eLNE F	11 52 53 11 54 10 12 11				705	

Year 1928, No. 11.

April 18th to May 1st, 1928.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char- acter	Phase	Greenwich mean time	Per- iod. s.	Ampli- tude A_N	Ampli- tude A_E	Dis- tance. Km.	Remarks.
97	18	I _u	ePE ePN eSN eSE eLE eLN ME MN F	19 35 32 19 35 33 19 47 20 19 47 22 20 08 10 20 08 16 20 11 41 20 13 32 21 12		μ	μ		10560 Bulgaria.
98	19	I _v	ePNE F	14 27 51 14 34				220	Western Luzon.
99	22	I _v	ePNE F	5 01 43 5 05				240	
100	22	I _v	ePNE F	5 06 40 5 16				330	
101	23	I _v	ePNE iLNE F	0 45 19 0 45 37 0 51				160	
102	24	I _r	ePNE eLNE F	19 47 42 19 53 36 20 34				2540	
103	27	I _v	ePNE F	3 15 15 3 17				120	
104	27	II _d	iPNE iLNE F	12 37 00 12 37 18 12 54				160	SW of Luzon in the China Sea.
105	27	I _v	ePNE iLNE F	13 50 20 13 51 30 14 07				640	Balingtang Channel near S Batan Is- land.
106	27	I _v	ePNE F	15 03 56 15 07				180	
107	27	I	eNE F	20 55 00 21 37					Traces only.

M A Y , 1 9 2 8 .

108	1	I	eNE F	11 43 00 11 58					Small movements.
109	1	II _v	iPNE iLNE MN ME F	14 21 55 14 22 14 14 22 17 14 22 17 14 35	3	160	169	170	Western Luzon.

Year 1928, No. 12.

May 1st to 20th, 1928.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char- acter	Phase	Greenwich mean time	Per- iod.	Amplitude A_N	Amplitude A_E	Dis- tance.	Remarks.	
				h. m. s.	s.	μ	μ	Km.		
110	1	I	eNE MNE F	19 15 00 19 35 00 19 57						
111	8	I _v	ePN iLN	4 58 40 4 59 17				330	End overtaken by the following earthquake.	
112	8	I _v	ePN iLN F	5 01 29 5 02 09 5 06				360	Microseisms on the 6th, moderate on the 7th and strong on the 8th and 9th due to a typhoon over the Pacific.	
113	9	I _v	ePNE F	1 38 43 1 41						
114	11	I _v	ePNE eLNE F	15 24 48 15 25 33 15 30				410	Microseisms on the 10th and 11th.	
115	12	I _v	ePNE F	12 55 14 12 57				120		
116	14	I	ePNE F	6 59 13 7 14					Small movements.	
117	14	II _u	ePE ePN iPR1E iPR2E iPR3E SE SN LE LN ME MN F	22 34 46 22 34 48 22 36 09 22 37 31 22 42 33 22 50 28 22 50 43 23 28 52 23 29 00 23 33 45 23 35 32 1 03			23 22	4 8	15600	Chachapoyas (Peru) and Ecuador.
118	15	I _v	ePNE F	2 56 16 3 10						
119	15	I _v	ePNE F	9 48 46 9 52				225		
120	17	I _r	ePNE iLNE F	10 59 05 11 01 34 11 32						
121	18	I _v	ePNE F	12 57 45 13 03				390	Southeastern part of Luzon.	
122	19	I _r	ePNE eLNE F	9 38 45 9 44 00 10 04						
123	19	I _v	ePNE F	12 37 33 12 43				330		
124	20	I _r	ePNE eLNE F	16 34 29 16 41 20 17 03						

Year 1928, No. 13.

May 21st to 31st, 1928.

M A N I L A., P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iод.	Amplitude AN	AE	Dis-tance.	Remarks.
125	21	II _v	iPNE	4 01 02		μ	μ	Km.	
			iLNE	4 01 26				220	Western part of Luzon.
			MN	4 01 28	2	290			
			ME	4 01 30	2		217		
			F	4 15					
126	23	I _v	ePNE	18 57 22				50	
			F	19 00					
127	23	I _r	ePNE	20 59 24					
			eLNE	21 03 13					
			F	21 27					
128	27	II _r	ePNE	9 56 52				5000	
			PSE	10 02 22					
			iSN	10 03 37					
			SH	10 03 43					
			1SP2E	10 06 46					
			1SR2N	10 07 26					
			iLN	10 10 22					
			iLE	10 10 23					
			ME1	10 12 53	18		33		
			MN1	10 12 56	16				
			MN2	10 14 40	15	25			
			ME2	10 15 36	14	24			
			F	12 24			60		
129	27	I _v	ePNE	18 30 59				210	
			eLNE	18 31 22					
			F	18 41					
130	28	I	ePNE	6 52 17					Small movements.
			F	7 29					Agusan Valley.
131	28	I _v	ePNE	15 02 36				330	Northwestern part of Luzon.
			F	15 07					
132	28	I _u	eNE	15 42 42					
			eLE?	15 57 32					
			F	16 40					
133	31	I	eNE	7 34 00					Small movements.
			F	8 04					
134	31	I _r	ePNE	13 52 09					
			eLNE	13 56 35					
			F	14 55					
135	31	I _r	ePNE	20 57 05					
			iLNE	20 59 50					
			F	21 49					
136	31	I	eNE	23 38					Traces only.
	June 1		F	0 27					

Year 1928, No. 14.

June 1st to 7th, 1928.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.

 $\phi = 14^\circ 34' 41''$ N. $\lambda = 120^\circ 58' 33''$ E. $h = 2.40$ ms. Alluvium.

Instrument: Wiechert's astatic pendulum (1,000 Kg.)

	T_0	V	ϵ	$\frac{r}{T_0^2}$
A_N	6.58	198	2.288	0.039
A_E	7.77	198	1.487	0.049

No.	Date	Char- acter	Phase	Greenwich mean time	Per- iod.	Amplitude	Dis- tance.	Remarks.
137	1	I _r	ePNE	8 03 36				
			iLE	8 06 40				
			F	8 49				
138	1	I _v	ePNE	11 59 51				
			F	12 03				
139	1	I _u	ePNE	13 18 47				
			iSN	13 26 11				
			iSE	13 26 14				
			eLN	13 34 00				
			eLE	13 34 22				
			MN	13 36 36	15	7		
			ME	13 37 44	16		6	
			F	14 48				
140	2	II _v	ePNE	8 49 57				
			iLNE	8 50 36				
			F	9 11				
141	3	I	eNE	3 01 29				
			F	3 26				Very small move- ments.
142	3	II _r	ePNE	8 35 17				
			iLN	8 44 00				
			iLE	8 44 43				
			ME	8 46 02	11			
			MN	8 47 11	11		29	
			F	10 09				
143	3	I	ePNE	9 23 10				Small movements.
			F?					
144	4	II _v	ePNE	14 30 06				
			iLNE	14 30 41				
			F	14 41				
145	5	I	eNE	5 59 17				Traces only.
			F	6 29				
146	5	I _v	ePNE	20 26 49				
			F	20 29				
147	7	I	iLNE	6 34 22				
			F	6 50				
148	7	I _v	ePNE	18 12 52				
			F	18 16				
							310	

Year 1928, No. 15.

June 8th to 15th, 1928.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iod.	Amplitude A_N	Amplitude A_E	Dis-tance.	Remarks.
				h. m. s.	s.	μ	μ	Km.	
149	8	I _V	ePNE	2 28 38					
			iLNE	2 29 03				225	
			F	2 39					
150	8	I	eNE	14 50 44					Small movements.
			F	15 33					
151	14	I _V	ePNE	3 33 34				490	Microseisms on the 12th, 13th and 14.
			iLNE	3 34 28					
			F	3 44					
152	15	III _d	iPNE	6 13 12				200	SW Mindoro Island. Maxima and end lost by the force of the shock.
			iLNE	6 13 34					
153	15	I _V	ePNE	6 53 12				210	Aftershock.
154	15	I _V	ePNE	6 55 53				220	Aftershock.
155	15	I _V	ePNE	7 04 45				230	Aftershock.
156	15	II _V	iPNE	7 19 30				220	Aftershock.
			F	7 25					
157	15	I _V	ePNE	7 27 58				215	Aftershock.
158	15	I _V	ePNE	7 42 06				200	Aftershock.
159	15	I _V	ePNE	8 29 57				230	Aftershock.
160	15	I _V	ePNE	8 49 03				220	Aftershock.
161	15	II _V	iPNE	9 10 47				240	Aftershock.
			F	9 16					
162	15	I _V	ePNE	9 24 47				230	Aftershock.
163	15	I _V	ePNE	9 31 26				200	Aftershock.
164	15	I _V	ePNE	9 42 32				210	Aftershock.
165	15	I _V	ePNE	9 55 03				220	Aftershock.
166	15	I _V	ePNE	11 20 27				210	Aftershock.
167	15	I _V	ePNE	11 22 43				220	Aftershock.
168	15	I _V	ePNE	11 47 32				210	Aftershock.
169	15	I _V	ePNE	11 51 17				220	Aftershock.
170	15	II _V	iPNE	12 11 08				225	Aftershock.
			F	12 15					
171	15	I _V	ePNE	13 28 02				220	Aftershock.
172	15	I _V	ePNE	14 53 41				220	Aftershock.
173	15	I _V	ePNE	14 56 47				230	Aftershock.
174	15	I _V	ePNE	16 48 35				225	Aftershock.
175	15	III _d	iPNE	17 16 45				225	2nd earthquake of SW Mindoro Island
			F	17 47					
176	15	I _V	iPNE	17 30 18				230	Aftershock.
177	15	II _V	iPNE	17 33 04				230	Aftershock.
			I _V	ePNE	17 55 11			230	Aftershock.

Year 1928, No. 16.

June 15th to 19th, 1928.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iod.	Amplitude AN	Amplitude AE	Dis-tance,	Remarks.
179	15	I _v	ePNE	18 00 53	s.	μ	μ	Km.	Aftershock.
180	15	I _v	ePNE	18 37 41				230	Aftershock.
181	15	I _v	ePNE	20 34 29				230	Aftershock.
182	15	I _v	ePNE	21 24 28				220	Aftershock.
183	15	I _v	ePNE	21 58 11				220	Aftershock.
184	16	I _v	ePNE	1 06 35				225	Aftershock.
185	16	II _v	ePNE	6 27 09				230	Aftershock.
			F	6 42					
186	16	I _v	ePNE	11 40 33				220	Aftershock.
187	16	I _v	ePNE	15 00 13				220	Aftershock.
188	16	II _v	ePNE	15 37 08				210	Aftershock.
			F	15 49					
189	16	I	ePNE	18 33 42					
			F	18 54					
190	16	I _v	ePNE	19 38 39				220	Aftershock.
191	17	I _u	ePNE	3 39 00				13500?	Pacific, off Mexi-can coast.
			eSN?	3 52 21					
			eSE?	3 52 33					
			eLN _E	4 24 24					
			F	6 03					
192	17	I	iPNE	6 52 04					
193	17	I _v	ePNE	7 00 08				220	Aftershock.
194	17	I _v	ePNE	13 21 28				210	Aftershock.
195	17	I _v	ePNE	17 21 58				220	Aftershock.
196	17	I _v	ePNE	23 24 00				220	Aftershock.
197	18	II _v	ePNE	6 31 45				220	Aftershock.
198	18	I _v	ePNE	8 33 49				210	Aftershock.
199	18	I _v	ePNE	9 54 00				200	Aftershock.
200	18	I _v	ePNE	13 08 01				380	
			F	13 16					
201	18	I _v	ePNE	15 30 10				225	Aftershock.
202	18	I _v	ePNE	17 27 22				220	Aftershock.
203	18	I _r	ePNE	22 00 19				2940	
			eLN _E	22 07 22					
			F	22 58					
204	19	I _v	ePNE	8 15 26				200	Aftershock.
205	19	I	eNE	8 29					Small movements.
			F	9 05					
		I _v	ePNE	21 00 00				225	Aftershock.

Year 1928, No. 17.

June 20th to 27th, 1928.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iod. h. m. s.	Amplitude		Dis-tance. Km.	Remarks.
						N	E		
207	20	I _V	ePNE	1 57 54				230	Aftershock.
208	20	I _V	ePNE	7 54 54				225	Aftershock.
209	20	I _V	ePNE	13 55 00				210	Aftershock.
210	21	I _u	ePNE	10 51 20				7410	Fiji Island.
			eLNE	11 13 00					
			F	12 14					
211	21	I _u	eNE	16 39 33					
			eLNE	17 10 09					
			F	18 20					
212	21	I _V	ePNE	23 58 21				225	Aftershock.
213	22	I _V	ePNE	9 16 38				540	
			F	9 23					
214	22	I _V	ePNE	9 32 46				220	Aftershock.
215	22	I _V	ePNE	10 18 38				160	
			F	10 22					
216	22	I _v	ePNE	10 23 26				210	Aftershock.
217	22	I _v	ePNE	13 33 09				220	Aftershock.
218	22	I _v	ePNE	15 17 55				230	Aftershock.
219	22	I _v	ePNE	16 54 31				220	Aftershock.
220	22	I _v	ePNE	20 17 18				225	Aftershock.
221	23	I _v	ePNE	1 44 43				220	Aftershock.
222	23	I _v	ePNE	21 40 52				230	Aftershock.
223	24	I _r	ePNE	4 43 29					
			iLNE?	4 50 44					
			F	5 01					
224	24	II _v	ePNE	12 07 33				340	
			iLNE	12 08 11					
			F	12 22					
225	24	I	eNE	20 34 20					
			F	20 52					
226	25	I _V	ePNE	5 58 06				435	
			eLNE	5 58 54					
			F	6 10					
227	26	I _V	ePNE	4 35 26				225	Aftershock.
			F	4 39					
228	27	I _V	ePNE	1 33 00				540	Near Batanes Is-
			iLNE?	1 33 59					lands.
			F	1 50					

Year 1928, No. 18.

June 27th to 30th, 1928.

M A N I L A., P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iod.	Amplitude AN	Dis-tance.	Remarks.
				h. m. s.	s.	Y) ^u	Km.
229	27	I _v	ePNE F	16 07 42 16 11				225
230	28	I _v	ePNE F	4 43 30 4 50				240
231	29	I _v	ePNE iLNE F	11 33 15 11 34 24 11 44				630
232	29	II _r	iPNE iLNE F	19 42 48 19 45 44 20 53			1320	Pacific, off SW coast Mindanao.
233	29	I _u	ePNE iLNE? F	22 59 34 23 14 00 0 42				5290?
	30							

Year 1928, No. 194

July 1st to 14th, 1928.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.

 $\phi = 14^\circ 34' 41''$ N. $\lambda = 120^\circ 58' 33''$ E. $h = 2.40$ ms. Alluvium.

Instrument; Wiechert's astatic pendulum (1,000 Kg.)

	T_0	V	ϵ	$\frac{r}{T_0^2}$
A _N	7.43	184	1.570	0.054
A _E	7.59	187	1.576	0.046

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iod.	Amplitude A _N	A _E	Dis-tance.	Remarks.
234	2	I _v	ePNE F	13 58 09 14 04	h. m. s.	s.	¶ ¶	Km.	210
235	4	I	eNE F	21 42 48 22 47					Traces only. Dis-tant earthquake.
236	5	I _v	ePNE F	3 16 11 3 21				225	
237	5	I _v	ePNE F	14 59 21 15 03				210	
238	7	I _r	ePNE eLNE F	18 07 00 18 12 22 18 38					
239	8	I _v	eLNE F	21 27 37 21 32				270	
240	9	II _u	iPE iPN iPR1E iSR1N iSR2N iSR2E iLNE ME F	21 31 53 21 31 50 21 34 03 21 42 22 21 43 51 21 44 09 21 47 00 21 48 38 23 27		20	24	5500	Near Solomon Is-lands?
241	10	I	eNE F	9 48 00 10 13					Very small move-ments. Microseis. on the 10th.
242	12	I _v	ePNE F	2 57 00 22 59				200	Moderate micros. from 11th to 15th due to a typhoon.
243	13	I _v	ePNE F	7 01 31 7 05				240	

Duplicate.

Year 1928, No. 19.

July 1st to 14th, 1928.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.

$\theta=14^{\circ} 34' 41''$ N. $\lambda=120^{\circ} 58' 33''$ E. $h=2.40$ ms. Alluvium.

Instrument: Wiechert's astatic pendulum (1,000 Kg.)

		T_0	V	ϵ	$\frac{r}{T_0^2}$
	A _N	7.43	184	1.570	0.054
	A _E	7.59	187	1.576	0.046

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iod.	Amplitude A _N	A _E	Dis-tance.	Remarks.
234	2	I _v	ePNE F	13 58 09 14 04	h. m. s.	s.	¶ ¶	Km.	210
235	4	I	eNNE F	21 42 48 22 47					Traces only. Dis-tant earthquake.
236	5	I _v	ePNE F	3 16 11 3 21					225
237	5	I _v	ePNE F	14 59 21 15 03					210
238	7	I _r	ePNE eLNNE F	18 07 00 18 12 22 18 38					
239	8	I _v	eNNE F	21 27 37 21 32					270
240	9	II _u	iPE iPN iPRLE iSR1N iSR2N iSR2E iLNE ME F	21 31 53 21 31 59 21 34 03 21 42 22 21 43 51 21 44 09 21 47 00 21 48 38 23 27		20	24	5500	Near Solomon Is-lands?
241	10	I	eNE F	9 48 00 10 13					Very small move-ments. Microseis. on the 10th.
242	12	I _v	ePNE F	2 57 00 2 59				200	Moderate micros. from 11th to 15th due to a typhoon.
243	13	I _v	ePNE F	7 01 31 7 05				240	

Year 1928, No. 20.

July 15th to 31st, 1928.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iod.	Amplitude AN	Amplitude AE	dis-tance.	Remarks
				h. m. s.	s:	μ	μ	Km.	
244	15	I _r	ePNE iLNE? F	23 18 40 23 21 37 23 32				1320?	Pacific, SE Min-danao.
245	18	II _u	iPE ePN eSE? iSE? eLN? eLE? F	19 25 13 19 25 16 19 47 17 19 47 44 20 21 22 20 21 30 21 32				17000?	Pacific, NW Peru. Confused by mi-croseisms. Microseisms from 19th to 25th.
246	19	I _v	ePNE F	3 15 21 3 19				240	
247	19	I _r	ePNE eLNE F	20 19 15 20 23 24 20 46					
248	20	I _v	eHME F	10 57 43 11 00				130	
249	21	I _r	ePNE iLNE F	2 44 09 2 48 03 3 21					
250	24	III _v	iPNE iLNE MN ME F	23 03 14 23 03 40 23 03 45 23 03 47 23 16	3	118	75	230	China Sea near w coast of Pangasinan.
251	26	I	iNE F	12 20 40 12 41					Moderate microseis. on the 26th, 30th and 31st. Heavy microseisms from 27th to 29th.

Year 1928, No. 21.

August 1st to 15th, 1928.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.

 $\phi=14^{\circ} 34' 41''$ N. $\lambda=120^{\circ} 58' 33''$ E. $h=240\text{ms}$. Alluvium.

Instrument: Wiechert's astatic pendulum (1,000 Kg.)

	T_0	V	ε	$\frac{r}{T_0^2}$
A_N	6.78	194	2.384	0.063
A_E	6.72	208	2.088	0.075

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iod.	Amplitude A_N	Amplitude A_E	Dis-tance.	Remarks.
252	2	I _v	ePNE eLNE F	8 19 26 8 19 50 8 27	s.	μ	μ	Km.	220
253	3	I _r	ePNE F	18 48 51 19 07					
254	3	I _r	ePNE F	21 06 32 21 23					
255	4	II _u	eNE? isNE? eLNE? F	18 47 38 19 01 00 19 31 10 20 58				13600?	Mexico, confused by microseisms.
256	5	III _d	iPNE iLNE F	14 42 26 14 42 47 15 46				190	China Sea near Zambales coasts.
257	7	I	eNE F	4 19 4 41					Very small, confused by microseisms.
258	9	I _v	ePNE F	18 46 27 18 49				190	
259	11	I _v	ePNE iLNE F	12 24 44 12 25 29 12 29				410	NE Luzon.
260	12	II _r	iPNE iLE iLN MN ME F	8 12 00 8 16 18 8 16 23 8 16 28 8 16 46 9 32	7 183			1920	
261	12	I _r	ePNE eLNE F	15 53 45 15 56 23 16 27	6	123		1200	
262	15	I	eNE F	17 40 18 12					Very small disturbed by microseisms.

Year 1928, No. 22.

August 16th to 26th, 1928.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char- acter	Phase	Greenwich mean time	Per- iod.	Amplitude A_N	Amplitude A_E	Dis- tance.	Remarks.
				h. m. s.	s.	μ	μ	Km.	
263	16	I _v	iPNE F	11 35 39 11 38				10	
264	16	I _v	iPNE iLNE F	23 50 28 23 50 48 23 55				180	
265	17	I _v	ePNE F	19 59 26 20 03				120	Central Luzon.
266	20	I _v	ePNE F	8 35 47 8 40				130	
267	23	I	eNE F	1 31 2 08					Small movements.
268	23	I	ME F	4 25 00 4 44					
269	23	I _v	ePNE iLNE F	9 39 11 9 39 20 9 42				80	
270	24	II _r	ePNE iSN iSE iLNE ME MN F	21 52 45 21 57 17 21 57 23 22 00 10 22 00 38 22 00 43 22 58	7		58		
271	24	I	eNE ME F	23 27 24 23 46 01 0 04					Traces only.
25									
272	25	I _v	ePNE iLNE F	8 47 04 8 47 26 8 52				230	
273	25	I _v	ePNE eLNE F	12 31 00 12 32 32 12 47				850	Western part of Mindanao.
274	26	I _v	ePNE F	5 06 51 5 10				270	
275	26	I _r	ePNE iLE F	22 13 24 22 16 41 22 34					

Year 1928, No. 23.

August 27th to 31st, 1928.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iod.	Amplitude A_N	Amplitude A_E	Dis-tance.	Remarks.
				h. m. s.	s.			Km.	
276	27	I _v	ePNE F	5 38 54 5 43				220	
277	27	I _v	ePNE F	10 57 24 11 01				200	
278	28	I _r	ePNE eLNE? F	8 30 46 8 36 00 8 59					Felt slightly at Talacogon (E Min- danao).
279	29	I _r	ePNE eLNE F	3 32 00 3 35 00 3 54					
280	29	I _r	ePNE iLNE F	17 19 02 17 21 51 17 54					
281	30	I _r	ePNE iSE iLN iLE MN ME F	6 33 07 6 36 57 6 38 12 6 38 38 6 40 35 6 40 37 7 55	8 10	33	31		
282	30	I _v	ePNE F	7 33 19 7 36				160	
283	30	I	eNE F	10 58 26 11 02					Small movements.
284	30	I	eNE F	12 21 12 43					Traces only.
285	31	I	eNE F	0 49 1 12					Small movements.

Year 1928, No. 24.

September 1st to 11th, 1928.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.

 $\phi=14^{\circ} 34' 41''$ N. $\lambda=120^{\circ} 58' 33''$ E. $h=2.40$ ms. Alluvium.

Instrument: Wiechert's astatic pendulum (1,000 Kg.)

	T_0	V	ϵ	$\frac{r}{T_0^2}$
A_N	6.78	194	2.384	0.063
A_E	6.72	203	2.088	0.075

No.	Date	Char- acter	Phase	Greenwich mean time	Per- iod.	Amplitude A_N	Amplitude A_E	Dis- tance.	Remarks.
				h. m. s.	s.	μ	μ	Km.	
286	1	I _u	ePNE eSN eSE iLE iLN MN1 ME1 ME2 MN2 F	6 18 00 6 26 18 6 26 23 6 38 00 6 38 07 6 41 05 6 44 09 6 46 13 6 48 50 8 26	15 14 11 11 10	11	9 12		
287	3	I _v	ePNE iLNE F	21 19 07 21 20 10 21 42				570	Balingtan Channel.
288	3	I	eNE F	21 53 23 22 49					Small movements confused by micro-seisms.
289	4	I _v	ePNE iLNE F	5 20 25 5 20 58 5 27				300	
290	5	I	eNE F	2 29 2 58					Small movements confused by micro-seisms.
291	6	I	eE F	6 43 7 04					Traces only.
292	7	I _r	eNE eLE F	2 54 20 2 58 22 3 48					
293	7	I _v	ePNE F	20 00 38 20 05				180	
294	10	I _v	ePNE F	11 38 38 11 42				190	
295	11	I _r	ePNE iLNE? F	0 44 23 0 50 30 1 31					

Year 1928, No. 25.

September 13th to 20th, 1928.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char- acter	Phase	Greenwich mean time	Per- iod.	Amplitude A_N	Amplitude A_E	Dis- tance.	Remarks.
				h. m. s.	s.	μ	μ	Km.	
296	11	I _v	ePNE F	2 49 34 2 54				120	
297	11	I	eNE F	12 57 13 37					Small movements.
298	12	I _r	ePNE iLNE F	1 30 40 1 39 32 2 23					
299	13	II _r	ePNE iSNE iLNE ME MN F	3 29 37 3 33 21 3 34 51 3 35 57 3 36 00 5 02	12 10	45	53	2280	SE Sangir Island.
300	13	I _v	ePNE F	10 09 11 10 12				125	
301	14	I _v	ePNE eLNE F	0 52 44 0 54 00 1 09				690	Batanes Islands.
302	14	II _d	iPNE iLNE	21 11 35 21 11 53				160	China Sea near NW Mindoro Island. Maxima and end lost by the force of the shock.
303	14	III _d	iPNE iLNE F	21 14 54 21 15 11 21 30				150	China Sea near NW Mindoro Island.
304	15	I _v	ePNE iLNE F	3 01 59 3 02 13 3 12				125	
305	18	I _u	eNE eLNE? ME F	17 43 11 18 35 00 18 38 30 19 25	28		2		
306	18	I _u	eNE eLE? F	20 03 37 20 24 00 21 08					
307	19	I _r	ePNE iLN iLE F	8 21 00 8 25 12 8 25 19 9 00					Near Formosa.
308	20	I	eNE F	8 47 9 09					Traces only.

Year 1928, No. 26.

September 21st to 30th, 1928.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char- acter	Phase	Greenwich mean time	Per- iod.	Amplitude A_N	Amplitude A_E	Dis- tance.	Remarks.
309	21	Iv	ePNE	8 00 52		¶	¶	Km.	
			iLNE	8 01 15				210	
			F	8 06					
310	22	Iu	ePNE	7 40 37				5195	Near Solomon Is- lands.
			iPR ¹ E	7 42 36					
			iSNE	7 48 00					
			iSR ¹ NE	7 52 02					
			iSR ² E	7 52 51					
			iLN	7 56 13					
			iIE	7 56 27					
			MN1	7 57 05	11	9			
			ME ¹	7 58 10	14	11			
			MN2	8 05 00	15	11			
			ME ²	8 05 45	16	12			
			F	9 22					
311	24	Iv	ePNE	9 15 13				830	
			iLNE	9 17 43					
			F	9 54					
312	25	I	MN	5 07 28					
			F	5 20					
313	25	I	eNE	8 07					Traces only.
			F	8 56					
314	25	I	eNE	20 12					Small movements.
			F	21 22					
315	27	I	eE	1 03					Traces only.
			F	1 32					
316	27	Iv	ePNE	20 02 43				340	
			F	20 08					
317	28	Iv	ePNE	5 07 17				160	
			iLNE	5 07 35					
			F	5 13					
318	29	Iv	ePNE	14 03 45				140	
			F	14 15					

Year 1928, No. 27.

October 1st to 12th, 1928.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.

 $\phi=14^{\circ} 34' 41''$ N. $\lambda=120^{\circ} 58' 33''$ E. $h=2.40$ ms. Alluvium.

Instrument: Wiechert's astatic pendulum (1,000 Kg.)

	T_0	V	ε	$\frac{r}{T_0^2}$
A_N	6.85	198	1.960	0.067
A_E	6.64	207	2.103	0.054

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iod.	Amplitude	Dis-tance.	Remarks.
				h. m. s.	s.	μ	μ	Kmf
319	2	I _v	ePNE F	19 31 43 19 34				90
320	4	I _v	ePNE F	14 35 27 14 38				90
321	5	I _v	ePNE F	20 58 29 21 03				300
322	9	II _u	ePNE eP'N eP'E iPR ₁ N iPR ₂ E PSN PSE PPSNE iSR ₂ E iSR ₂ N iLE iLN ME MN F	3 20 25 3 23 25 3 23 29 3 26 00 3 28 22 3 36 15 3 36 18 3 37 40 3 48 26 3 49 00 4 05 58 4 06 33 4 15 57 4 16 30 6 05		PKP PKP	14500	Mexico.
323	10	I _r	ePNE eSE eSN iLNE ME F	20 41 53 20 46 13 20 46 44 20 49 25 20 51 14 21 48	10	7	7	
324	11	I	eNE F	23 47 0 31				
12								Small movements.
325	12	I _u	ePNE eLNE F	7 32 28 7 47 20 8 43				

Year 1928, No. 28.

October 13th to 19th, 1928.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iod.	Amplitude A_N	Amplitude A_E	Dis-tance.	Remarks.
				h. m. s.	s.			Km.	
326	13	II _r	ePNE iLE iLN F	15 20 40 15 22 52 15 23 00 16 15				1060	Pacific, SE coast of Mindanao.
327	14	II _v	ePNE iLNE ME MN F	12 54 28 12 55 00 12 55 33 12 55 37 13 08		5	69	290	NW Luzon.
328	15	I _r	ePNE eLE? eLN? F	8 38 19 8 45 36 8 45 58 9 42					
329	15	I _u	eNE iSN iSE iLN iLE ME MN F	14 29 09 14 36 17 14 36 31 14 44 33 14 44 36 14 52 08 14 52 09 16 04		15	122	5600	Near Baluchistan.
330	18	I _v	ePNE F	18 31 14 18 33				130	
331	19	I	eNE F	10 30 11 32					Small movements and disturbed by microseisms.
332	19	II _v	ePNE iLNE MN ME F	15 50 25 15 51 10 15 51 23 15 51 28 16 11	3	122	94	410	NE Luzon.

Year 1928, No. 29.

October 20th to 31st, 1928.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued,

No.	Date	Char- acter	Phase	Greenwich mean time	Per- iod.	Amplitude AN	Amplitude AE	Dis- tance.	Remarks
				h. m. s.	s.	¶	¶	Km.	
333	20	I _r	ePNE	12 51 09					
			F	13 19					Heavy microseisms.
334	21	I _r	ePNE	16 21 30					
			F	16 54					
335	22	I _v	ePNE	11 25 10				430	
			F	11 34					
336	23	I	eNE	18 02 12					
			F	18 20					Traces only. Heavy microseisms.
337	25	II _v	iPNE	3 59 54				170	
			iLNE	4 00 13					
			F	4 06					
338	26	II _v	ePNE	6 19 32				260	Tablas Island.
	26		iLNE	6 20 01					
			ME	6 20 09	3				
			MN	6 20 19	3	80	85		
			F	6 34					
339	26	I _v	ePNE	10 31 16				230	
			eLNE	10 31 42					
			F	10 40					
340	26	I	ePNE	11 29 50				240	From 28th to 31st heavy microseisms.
			F	11 38					

Year 1928, No. 30.

November 1st to 9th, 1928.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.

 $\phi=14^{\circ} 34' 41''$ N. $\lambda=120^{\circ} 58' 33''$ E. $h=2.40$ ms. Alluvium.

Instrument: Wiechert's astatic pendulum (Kg000 Kg.)

	T_0	V	ϵ	$\frac{r}{T_0^2}$
A _N	6.85	198	1.960	0.067
A _E	6.64	207	2.103	0.054

No.	Date	Char-acter	Phase	Greenwich mean time h. m. s.	Per-iod. s.	Amplitude A _N	Amplitude A _E	Dis-tance Km.
341	1	I _v	ePNE iLNE F	22 05 04 22 05 36 22 09				290
342	3	I _v	ePNE iLNE F	3 16 13 3 16 43 3 28				270
343	3	I _v	ePNE F	4 39 05 4 42				190
344	3	II _v	ePNE iLNE MN ME F	9 07 20 9 08 16 9 08 43 9 09 15 9 31	5	78	64	510
345	3	I _v	ePNE F	12 05 50 12 10				125
346	4	I _v	ePNE F	5 10 15 5 15				290
347	5	I _v	ePNE F	3 54 02 4 02				380
348	5	I	eLNE F	14 16 14 49				
349	6	I _u	ePNE iPR ₃ N iSE iSN ME MN F	4 14 50 4 16 17 4 22 46 4 22 49 4 26 00 4 26 12 5 43		9	23	6356 Near New Hebrides. Compression from SE.
350	7	I _v	ePNE F	19 29 19 19 32				110
351	9	I	ePNE F	11 10 37 11 37				Small movements.

Year 1928, No. 31.

November 10th to 20th, 1928.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Character	Phase	Greenwich mean time	Per iod	Amplitude AN.	Amplitude AE	Dis- tance	Remarks.
				h. m. s.	s.	"	"	Km.	
352	10	I	eNE F	12 37 51 13 17					Traces only.
353	10	I _v	ePNE F	16 04 49 16 15				330	
354	11	I _v	ePNE iLNE F	20 08 52 20 09 28 20 17				320	
355	11	I	eNE F	22 53 23 49					
356	14	I	eNE ME F	4 41 42 5 03 40 5 22					Very small move- ments.
357	18	III _r	ePNE iSN iSE iLE iLN F	2 36 23 2 40 45 2 41 07 2 43 27 2 43 48 4 03					
358	15	I _r	ePNE eLNE F	7 41 16 7 48 40 8 54					
359	15	I _v	ePNE F	12 07 25 12 10				90	
360	16	I _r	ePNE iLNE F	11 07 29 11 11 00 12 03					
361	18	I _v	ePNE iLNE F	14 01 22 14 02 38 14 11				700	Off SE Samar.
362	19	I	iLNE F	15 47 15 56					
363	20	I _u	iP'N eP'E iScPcPNE eLE ME F	20 55 41 20 55 41 20 59 12 21 53 00 21 56 04 22 21	26			18333	Off western coast of north- ern part of Chile.
							3		

Year 1928, No. 32.

November 21st to 30th, 1928.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued,

No.	Date	Char-acter	Phase	Greenwich mean time	Period	Amplitude	Dis-tance	Remarks.
				H / m. s.	s.	N	N	Km.
364	21	III _d	iPNE	17 00 19				Central Luzon. Heavy micro- seisms. Maxima lost by the force of the shock.
			iLNE	17 00 35				
			F	17 31				
365	22	I _v	ePNE	7 16 51			125	
			F	7 19				
366	22	I _v	ePNE	11 02 06			100	Heaviest micro- seisms from 22nd to 25th.
			F	11 04				
367	25	I _v	ePNE	7 33 53			130	
			F	7 36				
368	25	I _v	ePNE	7 59 32			150	
			F	8 02				
369	27	I _v	ePNE	5 53 33			310	Mountain Pro- vince.
			iLNE	5 54 07				
			F	6 01				
370	28	II _v	iPE	9 04 15			530	N and E records disturbed by microseisms.
			iLE	9 05 13				
			ME	9 05 29				
			F	9 21				
371	28	III _r	ePE	10 48 20				
			iLE	10 52 39				
			ME	10 53 19	9		316	
			F	11 52				
372	28	I	eE	11 56				
			F	12 13				
373	30	I _v	ePNE	3 36 48				
			F	3 40			130	

Year 1928, No. 33.

December 1st to 9th, 1928.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.

 $\phi = 14^\circ 34' 41''$ N. $\lambda = 120^\circ 58' 33''$ E. $h = -2.40$ ms. Alluvium.

Instrument: Wiechert's astatic pendulum (1,000 Kg.)

	T_0	V	ϵ	$\frac{r}{T_0^2}$
A _N	6.85	198	1.960	0.067
A _E	6.64	207	2.103	0.054

No.	Date	Char-acter	Phase	Greenwich mean time	Per-iод.	Amplitude	Dis-tance	Remarks.
				h. m. s.	s.	μ	μ	Km.
374	1	III _u	eP'NE	4 26 10				17000 Pacific near Chi-le.
			PR ₁ E	4 30 36				
			PR ₂ E	4 33 59				
			PR ₃ E	4 36 53?				
			ScPcPcS	4 37 05?				
			PR ₄ E	4 38 47				
			PR ₂	4 40 24				
			PPS	4 43 59				
			PPPS	4 45 14				
			SR ₂	4 56 07	(7)			
			e	5 15 00	60ca			
			L	5 19 45				
			M	5 31 30				
			e	6 02 30				
			ME	6 09 00	19.7			
			F	7 19			450	3 waves Gutenberg?
375	2	I _u	eP'NE	4 40 51				Sinusoidal waves until 6:22:00
			SNE	4 58 41				
			F	6 50				
376	2	I _v	ePNE	21 36 54			130	
			F	21 40				
377	4	I	eNE	13 01 48				Traces only.
			F	13 22				
378	4	I _v	ePNE	18 43 06			220	
			ILNE	18 43 30				
			F	18 57				
379	7	III _r	iPNE	9 19 10				
			ILNE	9 23 03				
			MN	9 23 35	10	290		
			ME	9 23 58	8		249	
			F	10 57				
380	9	I _r	ePNE	0 05 43				
			eLNE	0 12 11				
			F	0 41				
381	9	I _r	ePNE	5 13 17				
			ILNE	5 20 00				
			F	6 18				

Year 1928, No. 34.

December 9th to 25th, 1928.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char- acter	Phase	Greenwich mean time	Per- iod.	Amplitude AN	Amplitude AE	Dis- tance	Remarks.
				h. m. s.	s.	μ	μ	Km.	
382	9	Ir	ePNE iLN F	18 18 39 18 25 03 19 04					
383	10	Ir	ePNE eLNE F	4 39 22 4 45 00 5 03					
384	11	Iv	ePNE iLNE F	16 59 15 16 59 33 17 08				160	
385	12	Ir	ePNE iLNE? F	20 31 23 20 41 23 21 53					Records disturbed by microseisms.
386	13	Iv	ePNE F	18 00 50 18 02				90	
387	14	I	eE F	0 43 35 1 12					Small movements.
388	14	I	ME F	2 14 48 2 29					Traces only.
389	15	Iv	ePNE F	20 15 33 20 19				125	
390	16	I	ePNE F	4 51 28 4 54				90	
391	19	IIIr	ePNE iSE F	11 39 18 11 41 10 14 35				1040	N Celebes Sea, S Mindanao.
392	19	Ir	ePNE F	14 52 41 15 04				1040	Aftershock of the No. 391.
393	19	Ir	ePNE F	15 20 39 15 33				1040	Aftershock of the No. 391.
394	19	I	eE F	23 15 23 37					
395	20	I	eE F	2 50 14 3 05					Small movements.
396	20	I	eE F	17 30 04 17 44					Small movements.
397	21	Ir	eE F	3 35 17 3 52					Aftershock of the No. 391.
398	23	Iv	ePNE F	18 08 23 18 11				125	

Year 1928, No. 35.

December 26th to 31st, 1928.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY---Continued.

No.	Date	Char- acter	Phase	Greenwich mean time	Per- iod.	Amplitude		Dis- tance	Remarks.
						N	E		
399	26	I _v	ePNE F	9 55 23 9 59				240	
400	28	III _v	ePNE iLE iLN F	14 21 26 14 23 26 14 23 27 16 33				930	Near Illana Bay.
401	28	I _v	ePE eLE F	17 40 46 17 42 30 18 08				940	Aftershock of the No. 400.
402	28	I _v	ePE iLE F	18 46 45 18 48 27 19 17				940	Aftershock of the No. 400.
403	29	I _r	ePNE iLNE	2 07 33 2 10 55					End overtaken by the following earthquake.
404	29	I _r	ePNE eLNE MN F	2 12 18 2 15 14 2 17 00 2 47	11	8			
405	29	I	eNE F	9 33 9 46					Traces only.
406	30	I	iNE F	1 06 00 1 24					Small movements.
407	30	I _v	ePNE F	11 55 42 11 58				120	
408	30	I _v	ePNE F	17 33 06 17 35				40	

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