

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY

Ref 2720

 $\phi = 14^{\circ} 34' 42''$ N. $\lambda = 120^{\circ} 58' 41''$ E.

h=3 m.

International
Seismological
CentreCONSTANTS OF THE
GALITZIN-WILIP

	T_1	T	μ^2	V_B
N-S	12.6	12.9	0	400
E-W	11.8	11.9	.08	230
Z	11.6	9.0		

Cf. Theoretical Seismology.
Sohn, S.J.CONSTANTS OF THE WIECHERT
INVERTED PENDULUM. M 955 Kg.
January 1, 1939.

	T_0	V	ϵ	\bar{T}_0^2
N-S	4.2	213	2.5	0.092
E-W	4.2	270	2.8	0.083

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
Jan. 1939 #3 3rd	PNEZ SNE F	23 15 11 17 39 45	1420	
#4 5th	iPNEZ SNE F	3 24 08 25 4 15	155	Dilatation. Felt in W Luzon. $15^{\circ} 05' N$: $119^{\circ} 45' E$ by Manila and Baguio. 5 from the Wiechert and Horizontal.
#8 9th	ePNE SNEZ F	3 10 32 14 48 31	2755	
#16 16th	iPZ iPN SNE LNE F	2 18 52 56 23 19 26 15ca 3 40	2780	Guam, 130 Km. In the Nero Deep. Felt in Guam.
#17 20th	PNEZ SNEZ F	12 12 42 13 18 19	250	
#18 20th	ePNEZ SNE F	13 27 02 28 35 37	850	Felt in Samar and Leyte.
#19 20th	ePNEZ S?NE F	20 59 45 21 04 47 22 20	3455?	
#20 22nd	ePNE SNE LNE ME F	4 48 15 55 25 5 04 ca 08 ca 50	5555	
#21 22nd	ePNEZ iSNE F	9 24 18 58 35	280	Felt at Palanan.
#22 22nd	PNEZ SNE F	11 14 54 18 39 55	2310	

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SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.



No. and Date	Phase.	Greenwich Time h. m. s.	Dist., Km.	Remarks
Jan. 1939 #23 22nd	ePNEZ SNE F	13 38 37 44 54 15 37	4680	
#24 22nd	1PZ ePE SNE F	18 48 18 18 54 36 19 45	4690	
#25 24th	ePNEZ SE F	4 08 20 12 28 32	2645	
#26 25th	1P'Z eP'NE F	5 52 05 05 7 55		Dilatation from southeast.
#27 25th	PNEZ SNE F	10 58 02 40 57 57	1690	
#28 25th	PNEZ SE LNE ME F	17 26 17 31 28 35 20ca 38 10ca 18 30	3600	
#32 26th	PNEZ SNE LNE F	10 36 57 40 50 43 10ca 11 33	2435	
#33 26th	ePNEZ SNE LNE F	17 31 14 35 29 38 25ca 18 30	2745	
#35 27th	1PZ SE LE F	5 49 02 54 35 59 15ca 6 55	3955	Dilatation.
#36 27th	ePNEZ S?NE F	10 44 08 49 30 11 39	3765?	
#41 29th	PNEZ SNE F	0 43 18 36 48	145	Felt at Mindoro.
#42 29th	PNEZ SNE F	0 53 06 24 56	145	Felt in Mindoro.
#45 29th	1PZ ePNE SNE F	2 40 18 18 37 3 04	150	Dilatation. Slightly felt in Manila and strongly at San Teodoro, Mindoro.

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SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.



No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
Jan. 1939 #47 29th	PNEZ SNEZ F	5 12 26 46 23	160	Felt in Mindoro.
#48 29th	PNEZ SNEZ F	5 32 32 51 41	150	Felt in Mindoro.
#55 29th	ePNE S?NE F	15 31 57 37 57 16 06	4055?	
#58 30th	1PNEZ SNE LNE MN F	2 26 05 32 13 37 45ca 41 05oa 5 00	4335	Compression. 6°S: 155°E by Manila, apia, Honolulu. Data after P from the Wiechert. 7°S: 155°E by U.S.C.G.S.
#59 30th	PEZ SN F	5 31 27 37 39 7 20	4590	S from the Wiechert.
#61 30th	PNEZ SNE F	12 35 20 39 15 13 18	2465	
#62 30th 31st	1PZ ePNE SNE F	23 56 44 44 0 02 01 2 00	3520	Compression?
#63 31st	PNEZ SNE F	2 39 05 18 45	120	
#64	PNEZ SE F	4 21 49 27 57 5 05	4520	

Thirty-two insignificant or undecipherable disturbances on the following days of January: 2nd, 3rd, 5th(2), 8th, 10th(3), 12th, 14th, 15th(2), 25th, 26th(3), 27th, 28th(2), 29th(12), and 30th.

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SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.



International
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Centre

$\phi=14^{\circ} 34' 42''$ N.

$\lambda=120^{\circ} 58' 41''$ E.

$h=3$ m.

Alluvium.

CONSTANTS OF THE
GALITZIN-WILIP.

	T_1	T	μ^2	V_s
N-S	12.6	12.9	0	400
E-W	11.8	11.9	.08	229
Z	11.6	9.0		

CONSTANTS OF THE WIECHERT
INVERTED PENDULUM. $M=955$ Kg.
February 2, 1939.

	T_0	V	ϵ	$\frac{I}{T_0^2}$
N-S	4.2	208	2.5	0.093
E-W	4.3	250	2.6	0.079

Cf. Theoretical Seismology.
Sohn, S.J.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Kg.	Remarks.
Feb. 1939				
#65 1st	iPNE7 iCNE LNE MN F	1 44 24 48 34 51 ca 53 15ca 2 45	2665	Compression?
#66 1st	iPNEZ SNEZ F	7 30 23 38 8 03	120	Compression? Felt in southern part of Luzon.
#68 2nd	iPZ SNE LN MNE F	7 11 48 14 29 16 10ca 17 20ca 8 40	1545	Compression.
#71 2nd 3rd	PNEZ SNE MN F	23 24 32 30 46 40 20ca 0 27	4620	
#72 3rd	iPNZ SNE F	5 34 39 41 05 8 50	4655	Dilatation. 9° S: 159° E by U.S.C.G.S.
#74 3rd	iPNZ SNE F	20 24 47 35 00 21 30	9055	Compression?
#77 4th	iPZ SNE F	5 27 42 34 36 7 20	5310	
#79 4th	iPZ SNE F	11 36 36 38 30 12 48	1100	Felt at Davao.

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SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.



No. and Date	Phase.	Greenwich Time			Dist. Km.	Remarks.
		h.	m.	s.		
Feb. 1939						
#83 7th	ePNZ SNE LNE F	4	14	43	3290	
			19	34		
			22	45ca		
		5	08			
#89 9th	ePNZ SNE LNE MN F	11	50	54	3645	
			56	08		
		12	00	05ca		
			02	50ca		
			30			
#92 11th	ePZ SNEZ F	18	40	50	850	
			42	22		
		19	38			
#95 16th	ePNEZ SNE MNE F	18	57	22	4520	
		19	03	30		
			11	ca		
		20	15			
#97 17th	ePNEZ SNEZ F	13	55	27?	510	No time marks on Galitzin records.
			56	27?		
		14	13			
#98 17th	ePEZ SN F	19	46	36	3665	
			51	51		
		20	42			
#99 17th	ePNEZ SNE F	23	16	16	1465	
			18	48		
			56			
103 20th	PZ SNE F	2	45	55	1800	
			48	59		
		3	17			
104 20th	iPZ ePNE SE ME F	3	53	10	4680	Dilatation.
				10		
			59	27		
		4	09	05ca		
		5	20			
106 23rd	ePNEZ iSE LN F	10	12	24	3135	Dilatation(?)
			17	05		
			20	ca		
		11	36			
107 23rd	PNE SN F	15	54	49	3235	
			59	36		
		16	45			
111 24th	ePNEZ iZ SNE F	14	26	48	8165	
			27	04		
			36	25		
		15	30			

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.



No. and Date	Phase.	Greenwich Time			Dist. Km.	Remarks.
		h.	m.	s.		
Feb. 1939						
112	iPEZ	10	00	28	2765	Compression?
26th	SN		04	44		
	LN		07	20ca		
113	iPZ	10	33	41	2745	Compression?
26th	SNE		37	56		
	LNE		40	40ca		
	MNE		42	50ca		
	F	12	50			
114	iPEZ	2	42	51	4120	Compression.
28th	SNE		48	35		
	LN		53	40ca		
	MN		56	45		
115	PNEZ	3	53	27	2365	
28th	SNE		57	16		
	F	5	05			
116	PNE	19	01	59	360	
28th	SNE		02	45		
	F		16			

Twenty-seven insignificant or undecipherable disturbances on the following days of February: 1st, 2nd(2), 3rd, 4th(4), 5th, 6th, 7th(2), 8th(2), 9th(2), 10th, 13th(2), 17th, 18th(3), 20th, and 24th(3).

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SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.



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$\phi=14^{\circ} 34' 42''$ N. $\lambda=120^{\circ} 58' 41''$ E. $h=3$ m.

CONSTANTS OF THE
GALITZIN-WILIP.

CONSTANTS OF THE WIECHERT
INVERTED PENDULUM. $M=955$ Kg.
March 1, 1939.

	T_1	T	μ^2	V_s
N-S	12.6	12.9	0	400
E-W	11.8	11.9	.08	229
Z	11.6	9.0		

	T_0	V	ϵ	$\frac{-\bar{I}}{T_0^2}$
N-S	4.3	199	2.5	0.082
E-W	4.1	278	2.7	0.074

Cf. Theoretical Seismology.
Sohn, S.J.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1939 117 1st	- 1PZ SNEZ F	0 12 54 13 09 21	115	Slightly felt in Manila.
118 1st	P?NEZ SNE F	11 28 43 35 43 12 35	5420?	Disturbed by microseisms.
120 2nd	1PZ SN LE F	7 06 20 08 42 10 ca 8 25	1365	Dilatation. Disturbed by microseisms.
123 4th	ePNEZ SNE LNE MNE F	20 06 39 06 53 09 50ca 13 20ca 21 35	1220	Compression. Felt in Davao.
124 5th	1PZ SNE LNE F	2 16 31 18 43 19 50ca 3 40	1200	Compression. Felt in Davao.
125 5th	ePNEZ SNEZ F	15 12 31 48 18	135	
127 7th	ePNEZ SNE LNE F	2 00 46 06 11 10 05ca 3 45	3645	
128 7th	ePNEZ SNE LNE MNE F	15 14 34 23 08 34 24 39 40 16 40	7020	
129 7th	1PZ SNE LNE F	17 24 38 31 20 38 ca 18 45	4955	
130 8th	1PEZ 1SNE LNE MNE F	22 05 54 11 54 17 30ca 20 50ca 23 58	4390	Compression.

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SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.



No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
1939 131 10th	P?NE SNE LNE F	2 48 52 54 24 57 30ca 3 54	3945?	
132 10th	PNEZ SNEZ F	5 56 34 58 6 01	190	
134 10th	ePZ SNE MNE F	22 02 48 07 25 12 45ca 23 10	3680	
137 12th	iPZ ePNE SNEZ F	10 40 20 20 38 11 02	140	Compression. Ambulong, 100 Km.
143 15th	iPZ ePNE SNEZ F	14 00 15 15 31 23	125	Dilatation from NW. Felt slightly in Manila.
145 16th	PNE SNE F	5 09 22 39 18	135	From the Wiechert. No time marks on Galitzin records.
146 17th	iPNEZ SNEZ F	9 42 10 36 10 00	200	Compression from SE. Felt at Boac, Marinduque, and Romblon.
148 18th	PNEZ SN F	16 30 17 33 04 49	1600	
149 20th	iPNEZ SNE MN F	5 27 00 30 45 34 50ca 5 30	2310	Compression. Japan.
150 20th	iPZ SN F	22 09 50 13 35 40	2310	
151 21st	iPEZ iSNE MNE F	1 18 06 23 52 30 ca 4 50	4000	Compression.
152 21st	ePNEZ SNE? F	8 03 25 14 ca 9 25	?	
153 22nd	iPZ ePNE SN LNE F	3 52 00 05 57 34 59 43 5 40	2735	Compression.
154 22nd	ePEZ SNE LNE F	7 32 49 42 17 55 ca 10 25	2700	Compression.

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SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.



No. and Date	Phase.	Greenwich Time			Dist. Km.	Remarks.
		h.	m.	s.		
1939 155 23rd	iPZ ePNE SE LN F	16	32	02	8340	Compression.
				02		
			1	49		
			55	ca		
		17	50			
158 25th	ePNEZ SNEZ F	1	00	08	730	
			01	29		
			27			
159 25th	ePNZ SNE MNE F	1	45	36	1600	
			46	20		
			51	20ca		
		2	20			
160 25th	iPNZ SNE LNE F	5	43	04	2480	Dilatation from SE?
			47	00		
			48	20ca		
		6	45			
161 25th	iPNZ SNE	8	34	17	220	Compression.
				47		
163 25th	iPZ SNEZ F	8	43	27	220	
				57		
		9	08			
164 25th	ePNEZ SE F	19	13	09	2555	
			17	11		
			43			
170 29th	iPEZ ePN SNE F	0	22	52	2365	Compression.
				52		
			26	41		
		1	20			
171 29th	iPNEZ SN F	2	30	46	820	Compression. Felt at Dapa and at Tandag, Surigao. S from the Wiechert.
			32	15		
		4	15			
173 31st	ePEZ SNE F	22	22	32	4680	
			28	50		
			48			

Twenty-three insignificant or undecipherable disturbances on the following days of March; 1st, 2nd, 4th, 5th, 10th, 11th(2), 13th(3), 14th(2), 16th, 17th, 24th(2), 25th(2), 26th(2), 27th(2), and 31st.

MANILA OBSERVATORY

MARCH, 1939



We thankfully acknowledge the receipt of the following
Bulletins and Reports.

STATIONS

BULLETINS

Apia-----	October, November and December, 1938.
Batavia-----	January, February and March, 1938.
Bucarest-----	December, 1938 and January, 1939.
Denver-----	May, 1938.
Fordham-----	October, November and December, 1938.
Graz-----	February 17 to March 18, 1938.
Hamburg-----	October 23 to December 31, 1938.
Hong Kong-----	Preliminary Report of Principal earthquakes of February, 1939.
Hong Kong-----	February, 1939.
J.S.A.-----	Preliminary Bulletin of earthquakes of October 20, November 6 and 17, 1938.
Kew-----	January, 1939.
Ksara-----	Year 1936, and January, 1939.
La Plata-----	October and November, 1938.
Lemberg-----	January 1 to March 27, 1938.
Malaga-----	July 1 to December 31, 1937.
Melbourne-----	October, November and December, 1938.
Ottawa-----	September and October, 1938.
Palau-----	Year 1936, and July 27 to December 31, 1938.
Pasadena-----	Local shocks of October and November, 1938..
Pasadena-----	July, 1938, and Preliminary Report of January, 1939.
Pasadena-----	Local shocks of December, 1938, and January, 1939.
Perth-----	January, 1939.
Queensland-----	December, 1938 and January, 1939.
Riverview-----	January, 1939.
San Fernando-----	November and December, 1938.
Strasbourg:	
L'Institut-----	December, 1938.
Bureau Central-----	December, 1938.
Stuttgart-----	February, 1939.
Taihoku-----	February, 1939.
Uccle-----	March 21 to June 30, 1938.
Upsala-----	July 1, 1937 to June 30, 1938.
U.S.C.G.S.-----	Seismographic Report of April, 1937.
Wellington-----	December, 1938.
Zikawei-----	Preliminary Bulletin of March, 1939.
Zurich-----	December 1, 1938 to January 31, 1939.

MIGUEL SELGA, S.J.,
Director, Weather Bureau,
Manila, Philippine Islands.

WILLIAM C. REPETTI, S.J.,
Seismologist.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.



$\phi=14^{\circ} 34' 42''$ N. $\lambda=120^{\circ} 58' 41''$ E. $h=3$ m. Alluvium.

CONSTANTS OF THE GALITZIN-WILIP

CONSTANTS OF THE WIECHERT INVERTED PENDULUM. $M=955$ Kg.

April 1, 1939

	T_1	T	μ^2	V_s
N-S	12.6	12.9	0	400
E-W	11.8	11.9	.08	229
Z	11.6	9.0		

	T_0	V	E.	$\frac{r}{T_0^2}$
N-S	4.3	198	2.5	0.086
E-W	4.1	274	2.7	0.083

Cf. Theoretical Seismology.
Sohn, S.J.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
April 176 3rd	ePNEZ SE F	8 46 26 49 34 9 10	1835	
178 3rd	1PZ SE LN F	21 32 33 38 14 42 00 22 37	4055	
179 4th	ePZ SNE LN F	10 20 42 28 31 38 20 ^{ca} 11 35	6265	
180 4th	ePNE SNEZ F	11 53 19 47 12 00	215	Deep focus.
181 4th	1PEZ SNE F	16 47 33 48 48 17 32	670	Compression from SE. Felt in Guiuan and Dapa.
182 4th	ePNE SNE F	21 30 06 27 41	165	Felt in Baguio, 50 Km.
183 4th	P?NEZ SNE F	23 03 12 08 14 29	3455?	
184 5th	1PZ ePNE 1SNE F	9 47 23 23 52 57	215	Dilatation.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY,--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
April 185 5th	1PZ SNEZ LNEZ MNE F	16 52 34 17 00 46 11 ca 16 45ca 20 25	6665	Dilatation from SE. 19°S: 168°E by Riverview and Manila.
188 6th	ePNEZ SNEZ F	21 00 44 01 31 38	380	Felt at Laoag and Aparri.
189 8th	1PZ SNEZ F	15 10 22 44 20	175	Felt at Baguio. Baguio, 95 Km.
190 9th	ePNEZ SNE LN F	22 08 05 10 09 11 20 32	1190	
191 10th	1PZ ePNE 1SNEZ F	13 23 01 01 55 14 16	440	Dilatation. Deeper than normal. Felt at Laoag, Vigan and Baguio.
192 10th	ePNEZ SNE F	17 05 48 06 42 18	440	Aftershock of No. 191. Felt at Laoag.
196 13th	ePNE 1SNE F	19 22 28 45 29	135	
198 14th	ePNEZ SNE? F	15 55 46 56 58 16 17	640	Felt at Dumaguete.
199 14th	ePNE SNE F	19 25 35 26 06 35	230	
201 15th	1PZ SNE F	9 09 33 14 29 10 20	3370	
202 15th	ePNEZ SNE LNE F	20 15 44 25 40 41 ca 21 34	8645	
204 17th	ePNE SNE LNE F	10 13 15 15 25 16 29 33	1250	

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
April 206	iP ₁ Z	6 42 45	17510	Compression.
18th	iP ₂ NE	47		27°S: 71°W by U.S.C.G.S.
	SKKS	53 17		O=6:22:42
	LNE	7 41 ca		L from the Wiechart.
	F	10 50		
209	iPZ	22 18 11	7980	
20th	ePNE	11		
	iSN	27 39		
	LN	41 50ca		
	F	24 00		
210	iPNEZ	4 35 28	3480	Compression from NE. Deep focus.
21st	iSNE	40 31		
	LN	44 25ca		
	MN	47 25ca		
	F	6 04		
213	iPNEZ	11 27 31	1655	Dilatation.
22nd	SN	30 25		
	LNE	31 30ca		
	F	12 30		
215	ePNEZ	1 36 42	210	
23rd	iSNE	37 09		
	F	46		
216	ePNEZ	16 45 00		
23rd	F	18 36		
220	ePZ	14 47 41	140	
25th	iSNEZ	59		
	F	56		
221	ePEZ	15 43 55	270	Felt at Daet.
25th	SNE	44 33		
	F	52		
222	iPNZ	11 17 47	550	Compression. Felt at Basco, Laoag and Vigan.
26th	iSNEZ	18 51		Approx. 19° 35' N: 121° 15' E by Manila, Hong Kong and Baguio.
	F	12 38		
224	ePNEZ	19 54 02	150	
26th	iSNEZ	21		
	F	20 02		
226	ePNE	0 09 15	120	
28th	SNEZ	30		
	F	14		

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SEISMOLOGICAL BULLETIN OF THE OBSERVATORY. ← Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
April 1939				
231	ePEZ	3 03 37	5010	11°S: 158°E by U.S.C.G.S. Phases after P from the Wiechart.
30th	iSNE	10 22		
232	PNE	5 57 48	310	No. 231 still recording. From the Wiechart. Baguio, 190 Km.
30th	SNE	58 33		
	F	6 04		
234	PNEZ	14 11 05	4900	
30th	SNE	17 44		
	LN	23 30 ⁰⁰		
	F	15 40		

Twenty-eight insignificant or undecipherable disturbances on the following days of April: 1st, 2nd, 3rd, 6th(2), 12th, 13th(2), 14th, 15th(2), 17th, 19th(2), 21st(2), 22nd, 24th(3), 26th, 27th, 28th(3), 29th, and 30th(2).

MANILA, P. I.
SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.

0=14 34 42 N. λ=120 58 +1 E. h=3 m.



CONSTANTS OF THE
GALITZIN-WILIP

	T ₁	T	μ ²	V _S
N-S	12.6	12.9	0	400
E-W	11.8	11.9	.08	229
Z	11.6	9.0		

CONSTANTS OF THE WIECHERT
INVERTED PENDULUM. M=955 Kg.
May 1, 1939.

	T ₀	V	E	$\frac{r}{T_0^2}$
N-S	4.3	197	2.6	0.087
E-W	4.1	275	2.6	0.067

Cf. Theoretical Seismology.
Sohn, S.J.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
May 1939				
236 1st	PEZ SNE LNE F	4 36 19 40 41 43 20ca 5 40	2855	
237 1st	iPZ ePNE SNE LNE F	6 04 37 40 09 49 13 20ca 9 35	3610	Compression. Data after S from the Wiechert. 40°N: 139°E by U.S.C.G.S.
238 1st	ePNEZ SNE LNE F	11 56 42 12 01 41 05 40ca 13 10	3410	
240 1st	iPZ iSNE LNE MNE F	16 12 01 16 57 20 25ca 23 20ca 18 30	3400	Dilatation.
241 2nd	eEZ PSE LNE ME F	13 33 06 43 52 14 06 00 11 ca 16 40	12355	Galtzin N-S component not recording. 29.4°N: 113.5°W by J.S.A. 29.5°N: 113.8°W by U.S.C.G.S.
242 3rd	ePNEZ SNE LE	7 13 17 20 19 28 50ca	5455	
243 3rd	ePNEZ SNE F	8 21 12 26 56 9 27	4120	
244 3rd	ePNEZ SNE MN F	16 21 03 24 49 28 40ca 17 30	2320	
245 3rd	iPZ SNE F	22 59 47 23 01 06 18	710	Dilatation. Felt at Hinatuan, Port Lamoran and Butuan.

M A N I L A , P . I .
SEISMOLOGICAL BULLETIN OF THE OBSERVATORY, —Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
May 1939				
247 5th	ePNEZ SNE F	12 17 26 21 51 46	2890	
249 6th	eP ₁ NE SS GNE LNE MN F	6 20 18 42 30ca 48 00 7 12 ca 26 30ca 8 15	16480	Near 5°N: 84°W by U.S.C.G.S. O=6:02:11
251 6th	iPNE SNE	17 00 23 39	125	Dilatation from S. Deeper, than normal. Probable epicenter 13° 30' N: 121° 15' E, h=75 Km. H=17:00:07 S from the Horizontals. Very strong in Calapan, Mindoro; moderate in S Luzon.
253 6th	PNE SNE	17 21 09 25	125	2nd earthquake, aftershock of No. 251. From the Wiechert.
256 6th	PNE iSNE F	18 54 56 55 12 19 21	125	3rd earthquake, aftershock of No. 251.
258 6th	ePNE SN LNE F	20 12 49 19 27 26 30ca 21 26	5035	Disturbed by microseisms.
261 7th	ePNE SNE LNE F	0 34 29 38 54 41 40ca 2 10	2890	Galitzin Z component not recording.
265 7th	iPZ SNEZ F	6 47 34 50 59	125	Dilatation.
267 7th	eP?NEZ SNE F	7 16 12 21 42 8 10	3900?	
269 8th	ePNE SNE F	0 48 18 51 1 06	240	
270 8th	eP ₁ N PPNE PSNE LN MNE F	2 02 15 06 45 16 45 43 25ca 51 30ca 5 25	17200	Near 37°N: 24°W by U.S.C.G.S. O=1:46:48
274 8th	ePNE SNE F	23 45 48 46 04 49	125	
276	iBZ ePNE SNEZ F	8 08 34 34 48 30	110	Dilatation. Deeper than normal.



MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
May 1939				
277 9th	ePNEZ SNEZ F	13 06 49 07 04 16	120	
278 9th	ePEZ SE F	21 18 48 20 59 22 16	1260	
281 10th	ePEZ SNE LNE MNE F	7 54 23 8 02 55 14 25 ^{ca} 19 35 ^{ca} 9 02	6990	Compression. 51° N: 179° W by U.S.C.G.S.
284 11th	iPZ SNEZ	2 34 26 43	135	Dilatation.
285 11th	ePNEZ SNEZ F	2 43 43 44 00 47	135	
286 11th	iPEZ iSNE LN F	17 36 29 40 55 43 30 ^{ca} 18 30	2755	
287 12th	iPNZ SNEZ F	0 10 25 11 12 35	370	Dilatation.
288 13th	ePNEZ S?NE F	13 04 12 10 11 31	4360?	
289 13th	ePNEZ SNE F	19 56 47 20 02 19 20	3940	
290 14th	iPEZ iSNE F	18 24 04 33 41 19 25	8160	Compression. Deep focus.
292 16th	iPNEZ iSNEZ F	7 22 26 24 24 9 10	1130	Dilatation. Felt Strongly at Arisan, Formosa.
294 17th	FNEZ SNE F	0 24 58 27 33 56	1500	
296 17th	ePNEZ SNE ME F	15 16 53 22 39 30 45 ^{ca} 17 25	4150	
298 17th	iPNEZ SNE F	18 35 37 39 47 21 30	2555	Dilatation. S from the Wiechert.



M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
May 1939				
299 17th	ePNEZ SNE F	22 47 37 48 40 56	540	
302 19th	ePEZ SNE LNE MNE F	18 45 37 55 23 19 09 ca 16 20ca 20 21	8340	
304 21st	1PZ ePE SNE LN F	20 32 05 05 40 24 51 ca 21 52	6765	Dilatation. Deep focus.
305 22nd	1PNEZ SNE LNE F	1 40 40 45 58 49 10ca 3 10	3400	
308 23rd	ePNZ SE LNE F	4 29 00 34 39 39 ca 5 47	4045	
309 25th	PNE F	0 01 19 07		Trace. From the Wiechert. Felt at Vigan.
310 25th	1PNEZ SNE	6 16 50 17 23	240	Compression. Near 14° 30' N: 123° 10' E. Felt in southeastern part of Luzon and Marinduque Island.
311 25th	ePNEZ SNE F	6 59 48 7 00 21 8 15	240	Aftershock of No. 310.
313 26th	ePNEZ SNE LNE MNE F	9 47 50 54 24 10 01 40ca 04 50ca 11 10	4910	
315 26th	ePNEZ SNE LNE MN F	17 55 57 18 00 34 03 25ca 06 ca 19 52	3080	Compression.
316 26th	PNEZ SE F	20 11 45 16 51 33	3520	
318 27th	1PNEZ 1SNE 1LNE MNE F	3 51 22 57 14 4 02 25ca 05 45ca 6 10	4255	Compression.



MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.---Continued.



No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
May 1939 321 27th	ePNEZ SNE F	14 52 08 42 15 08	240	
324 28th	ePNEZ SNEZ F	4 09 04 10 18 52	700	
326 30th	PNZ SNE F	10 16 04 23 20 11 10	5700	

30th From 17:09:12 to 17:12:12 conspicuous group of about 14 seconds period waves on N component.

328 30th	PNEZ SN F	17 16 38 20 04 18 22	2010	
331 31st	PNEZ SNEZ F	15 46 13 20 16 01	210	Felt at Naga.
332 31st	PNEZ SNE F	18 09 49 12 36 26	1600	

Forty-three insignificant or undecipherable disturbances on the following days of May: 1st, 4th, 6th(8), 7th(5), 8th(3), 9th, 10th(+), 15th, 16th, 17th(2), 18th(2), 20th, 22nd(2), 26th(3), 27th(4), 28th, 30th(2), and 31st.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.

$\phi=14^{\circ} 34' 42''$ N.

$\lambda=120^{\circ} 58' 41''$ E.

h=3 m.

Alluvium.

CONSTANTS OF THE GALITZI-WILIP

	T_1	T	μ^2	V_s
N-S	12.6	12.9	0	400
E-W	11.8	11.9	.08	229
Z	11.6	9.0		

Cf. Theoretical Seismology.
Sohn, S.J.

CONSTANTS OF THE WIECHERT INVERTED PENDULUM. M=955 Kg.
June 1, 1939.

	T_0	V	ϵ	$\frac{r}{T_0^2}$
N-S	4.3	207	2.6	0.069
E-W	4.0	271	2.6	0.074

International Seismological Centre

No. and Date	Phase.	Greenwich Time			Dist. Km.	Remarks
		h.	m.	s.		
June 1939						
335 1st	ePNE SN F	16	16	17 21 05 51	3245	
337 2nd	iPNEZ SNE F	3	36	04 38 20 6 06	1310	Compression. Felt in Mindanao and Jolo. S from the Wiechert.
338 2nd	ePNEZ SNEZ F	6	11	06 41 30	250	Felt in southeastern part of Luzon.
341 3rd	iPNEZ iSNEZ F	5	47	16 46 6 35	220	Felt at Daet, Capalonga and Naga.
343 3rd	ePNEZ SN F	17	50	25 52 18 18 05	1070	
344 4th	ePNEZ SNEZ MN F	0	29	08 35 26 38 30ca 1 35	2790	Compression.
345 4th	ePNEZ SNEZ F	3	26	20 30 20 4 00	2535	Deeper than normal.
346 4th	PZ S?NE F	12	09	04 19 00 13 10		
347 4th	ePNEZ SNE LN F	15	21	12 27 09 31 20ca 16 30	4350	
352 5th	PEZ S?NE F	16	08	47 12 31 17 10	2300?	

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.



No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
June 1939				
353 6th	ePNEZ SNE F	6 32 06 34 31 7 05	1400	Dilatation.
354 6th	ePNE SE F	8 43 05 44 22 9 02	690	Felt at Dumaguete and Dapitan.
356 7th	iPZ SNEZ F	4 37 52 38 08 46	125	Dilatation. Felt at Naujan, Mandoro.
357 8th	ePNEZ SNE LN F	15 31 57 36 35 39 30ca 16 36	3090	
358 8th	iPEZ iSNE LNEZ F	20 58 06 21 07 48 21 30ca 23 05	8250	Compression. 15° S; 173° W, $h=100$ by U.S.C.G.S.
359 9th	ePNEZ SNEZ F	5 42 21 48 47	210	
360 9th	iPNEZ iSNE MN F	19 14 09 18 25 23 25ca 20 40	2755	Compression(?). Deep focus.
363 10th	ePNEZ SNEZ F	7 32 21 41 38	160	Probably SW. Ambulong, 100 Km.
365 10th	iPZ ePNE SNE F	9 47 49 49 52 13 10 15	2880	Deep focus.
367 11th	ePNEZ SNE F	11 12 26 14 49 38	1380	
368 12th	ePNEZ SKP SKKS? iE SS? LNE MN F	4 24 39 28 31 34 30ca 41 38 46 ca 5 19 ca 24 30ca 6 20	15970	21° 8N; 66° W, $H=4:05:11$ by U.S.C.G.S.
369 12th	ePZ S?NE F	13 23 23 24 58 45	600?	Felt at Basco.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.



No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
June 1939				
370 13th	iPZ ePNE SNE MN F	20 43 18 18 47 19 51 50ca 22 20	2545	Dilatation.
372 15th	ePNEZ SNEZ F	3 42 09 36 49	210	
373 15th	ePNEZ SNE F	14 03 45 07 53 15 00	2645	
374 16th	ePNEZ SNE MN F	5 21 51 25 30 29 35 6 10	2220	
375 16th	ePNEZ iSN iLN F	21 37 43 41 42 43 25ca 23 15	2520	Compression.
377 17th	ePEZ SN F	9 31 28 36 05 10 15	3080	
378 17th	ePNE S?E LE MN F	12 14 05 23 48 57 ca 43 45ca 13 30	8365?	
380 18th	ePNEZ iSNE MN F	3 54 05 56 14 58 30ca 5 00	1170	
381 18th	PNEZ SNE F	12 34 32 35 10 13 02	280	Felt at Naga.
382 18th	iPZ ePNE iNE F	17 05 38 38 07 10 50		Dilatation.
384 19th	ePNEZ SNE F	13 43 58 46 30 14 08	1465	
385 19th	ePNEZ SNE LNE MNE F	22 03 11 08 09 11 50ca 14 35ca 23 20	3400	

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.



No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
June 1939				
586 20th	ePNEZ SNE F	5 54 42 55 57 6 17	670	
390 22nd	1PZ SNE	19 13 25 15 27	1100	Deeper than normal. Felt at Dadiangas, Cotabato. Butuan, about 300 Km.
391 22nd	P?NEZ L?N F	19 39 41 20 23 ca 21 45		No. 390 still recording.
396 25th	ePZ ePNE iSNE F	2 48 05 11 52 21 3 40	2755	Deep focus.
398 26th	ePEZ SNE F	7 26 15 30 15 9 33	2530	
401 26th	ePNEZ iSNEZ F	23 12 50 59 19	70	Arbulong, 65 km.
403 27th 28th	iPNEZ iSNE F	23 06 39 08 26 1 30	1010	Compression from SE. S from the Wiechert. Dilatation from SE in Butuan. Probable epicenter, 7°30'N: 127°E. Felt generally in Mindanao, Leyte and Samar.

Thirty-three insignificant or undecipherable disturbances on the following days of June: 1st(3), 3rd(3), 4th(3), 5th, 7th, 9th, 10th(2), 11th, 14th, 17th(2), 19th, 20th, 21st, 22nd, 24th(4), 25th, 26th(2), 27th, 28th, 29th, and 30th.



SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.

$\phi=14^{\circ} 34' 42''$ E.

$\lambda=120^{\circ} 58' 41''$ N.

h=3 m.

Alluvium

CONSTANTS OF THE GALITZIN-WILIP

	T_1	T	μ^2	V_s
N-S	12.6	12.9	0	400
E-W	11.8	11.9	.08	229
Z	11.6	9.0		

CONSTANTS OF THE WIECHERT INVERTED PENDULUM. M 955 Kg. July 1, 1939.

	T_0	V	ϵ	$\frac{F}{T_0^2}$
N-S	4.3	205	2.6	0.081
E-W	4.0	269	2.6	0.089

Cf. Theoretical Seismology. Schon, S.J.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
July 1939				
407 1st	ePNEZ SNE F	13 27 15 32 12 14 17	3390	Probably deeper than normal.
409 2nd	ePNEZ SNE F	17 02 14 10 10 18 10	6390	Probably deeper than normal.
410 2nd	1PZ SN F	19 53 06 20 00 34 21 05	5910	Dilatation.
411 3rd	ePE SE F	5 41 14 43 00 55	1000	
416 4th	1P ₁ 'Z eP ₁ 'NE P ₂ 'Z 1E 1Z 1N 1SSNE LNE F	18 45 53 53 47 07 13 52 13 57 22 19 11 39 53 ca 20 50	18745	Compression. 23° S: 67° W, h=300-400 Km. by U.S.C.G.S. 19° 9S: 67° 3W, h=300 Km. by J.S.A.
417 5th	1PZ ePNE 1SNE F	8 47 40 42 49 35 10 00	1090	

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.



No. and Date	Phase.	Greenwich Time			Dist. Km.	Remarks
		h.	m.	s.		
July 1939						
419	iPEZ	22	51	06	7155	Dilatation. Deep focus.
5th	iPN			09		24°S: 179°W, h=500 Km. by U.S.C.G.S.
	iSNE		59	48		24°S: 180°W, h=550 Km. by J.S.A.
	LNE	23	12	30ca		
	MN		16	30ca		
6th	F	0	45			
420	ePNEZ	1	15	58	2480	
6th	SNE		19	54		
	MNE		25	ca		
	F		55			
422	PNEZ	6	26	16	5410	Disturbed by microseisms.
10th	SNE		33	15		
	F	7	10			
423	PNEZ	11	12	19	1145	
10th	SNE		14	18		
	F		25			
426	ePNEZ	22	08	49	190	
11th	iSNEZ		09	13		
	F		14			
427	ePNEZ	12	51	59	2655	Deep focus.
12th	SNE		56	08		
	F	13	25			
430	iPZ	23	03	54	3810	Dilatation?
12th	ePNE			54		
	iSNE		09	18		
	LN		13	50ca		
	MNE		16	45ca		
13th	F	0	45			
431	iPZ	17	10	31	3290	Compression?
13th	ePNE			31		
	SE		15	22		
	ME		21	05ca		
	F	18	10			
439	eP(?)Z	3	39	48	10320	Disturbed by microseisms. 0-3:26:32.
18th	SNE		50	55		
	iE		52	42		40°N: 150°5W, by U.S.C.G.S.
	F	5	30			
440	eP?NE	11	30	14	3490?	
18th	SNE		35	18		
	LN		39	35ca		
	MNE		42	20ca		
	F	12	20			

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
July 1939				
441 20th	ePNEZ SNE F	2 33 01 41 30 3 40	6840	Disturbed by microseisms.
443 25th	ePNEZ SE LE F	7 23 36 28 46 32 15ca 50	3590	Disturbed by microseisms.
446 25th	ePNEZ SN F	15 32 32 36 16 55	2300	
447 25th	ePNEZ SN F	22 09 18 12 38 40	1990	
449 27th	ePNEZ SNE F	5 15 17 20 00 55	3155	Disturbed by microseisms.

Twenty-three insignificant or undecipherable disturbances on the following days of July: 1st, 3rd(2), 4th(2), 5th, 9th, 11th(2), 12th(2), 14th(2), 15th, 16th(4), 23rd, 25th(2), 26th, and 28th.

M A N I L A , P . I .
SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.



$\phi=14^{\circ} 34' 42''$ N. $\lambda=120^{\circ} 58' 41''$ E. $h=3$. Alluvium.

CONSTANTS OF THE
GALITZIN-WILIP

	T_1	T	μ^2	V_s
N-S	12.8	12.9	0	400
E-W	11.8	11.9	.08	229
Z	11.6	9.0	.	.

CONSTANTS OF THE WIECHERT
INVERTED PENDULUM. M 955 Kg.
August 1, 1939.

	T_0	V	ϵ	$\frac{-\epsilon}{T_0^2}$
N-S	4.2	220	2.5	0.080
E-W	4.1	261	2.6	0.084

Cf. Theoretical Seismology.
Sohn, S.J.

No. and Date	Phase	Greenwich Time			Dist. Km.	Remarks
		h.	m.	s.		
457 4th	ePNEZ SNEZ F	2	00	27 50 20	185	Dilatation.
458 4th	PNEZ SNEZ F	2	31	52 32 48	200	Dilatation.
460 5th	ePNEZ ISEZ F	0	12	11 13 14	830	Dilatation from E at Butuan. Felt in NE Mindanao.
461 6th	ePNEZ SNE LE F	4	41	08 45 47 39	2610	
463 8th	1PZ ePNE 1SNE LN F	20	02	10 10 07 13 10	4190	Deeper than normal.
464 8th	ePNEZ SNE F	21	36	08 31 48	185	
466 9th	ePNEZ SNEZ F	16	35	23 35 43	95	
467 9th	ePNEZ SNE F	22	26	12 30 07	2400	
468 10th	P?NEZ S?N F	6	10	17 05 02	5210?	
473 12th	1PNEZ 1SNEZ MNE F	2	16	49 24 38 00	6010	Dilatation from ESE. 13° S: 169° E, $h=150$ Km. by U.S.C.G.S.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

International
Seismological
Centre

No. and Date	Phase.	Greenwich Time			Dist. Km.	Remarks
		h.	m.	s.		
474 12th	ePNEZ SNE LN MNE F	9 10 09 12 11	57 03 35ca 30ca 50	33	4530	Compression(?) 45°N: 153°E, 0=9:49.8 by U.S.C.G.S.
476 13th	ePNEZ SNE F	4 5	25 26 07	19 50	840	In the Philippine Deep. Felt at Guiuan, Samar.
479 14th	ePNEZ SNE F	3 4	51 57 22	12 20	4520	
481 14th	ePNEZ SNEZ F	14	17 18 25	46 06	160	
483 16th	PNE SNE F	19	42 43 51	46 06	160	Felt at Boac, Marinduque.
486 18th	1PZ ePNE SN LNE F	22	25 48 33 43 23	48 48 46 35ca 57	6280	Probably compression. 18°S: 168°E by U.S.C.G.S.
487 19th	1PNEZ SNE F	0 1 2	57 05 04	21 20	6440	
489 20th	ePNEZ SNE F	7	07 57 26	38 57	150	Felt in Manila. Ambulong, 100 Km. S from the Wiechert and Horizontals.
491 21st	PNEZ SNEZ F	5	35 50 47	22 50	215	
495 23rd	1PZ 1PN ePE 1SNEZ F	21	23 28 28 25 22	27 28 28 08 16	940	Dilatation. Near 8°N: 127°E. Felt in E Mindanao.
499 26th	ePNEZ SNE F	3 4	27 28 00	01 50	1030	

Thirty-four insignificant or undecipherable disturbances on the following days of August: 1st(3), 3rd(3), 4th, 8th, 9th, 10th, 11th(3), 13th(2), 14th(2), 16th, 17th(2), 20th(2), 21st, 22nd, 23rd, 24th, 25th(2), 27th(2), 28th, 30th(2), and 31st.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.



$\delta=14^{\circ} 34' 42''$ N. $\lambda=120^{\circ} 58' 41''$ E. $h=3$ m. Alluvium.

CONSTANTS OF THE GALITZIN-WILIP

	T_1	T	μ^2	V_s
N-S	12.6	12.9	0	400
E-W	11.8	11.9	.08	229
Z	116.	9.0		

CONSTANTS OF THE WIECHERT INVERTED PENDULUM. M 955 Kg.

September 1, 1939.

	T_0	V	ϵ	T_0^2
N-S	4.3	204	2.6	0.075
E-W	4.0	289	2.6	0.074

Cf. Theoretical Seismology.
Schon, S.J.

No. and Date	Phase.	Greenwich Time		Dist. Km.	Remarks
		h. m.	s.		
Sept. 1939					
507 2nd	iPZ iSNE LNE MNE F	9 08	02 28 40ca 20ca 25	5,880	Compression. Disturbed by microseisms.
508 3rd	iPZ ePNE iSNE F	7 45	29 29 44 20	670	Compression, Felt in Batanes Islands. S from the Wiechert.
510 6th	ePNEZ SNEZ F	2 52	51 14 55	185	Very small.
514 7th	iPZ ePN SNE F	13 46	01 01 04 23	3,480	
516 8th	iPZ ePNE SNE MNE F	6 56	11 11 11 ca 42	3,420	Compression,
517 8th	iPZ ePNE iSNE LE F	12 14	25 25 25 15ca 20	6,390	Compression? 51° N: 175° E, 0 12:04:45 by U.S.C.G.S.
520 9th	iPZ ePNE iSNEZ F	15 47	51 51 12 17	165	Dilatation. Felt at Iba.
521 9th	ePNEZ iSNE F	21 31	34 42 12	2,645	

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
Septm 1939				
522 11th	eP?NEZ SE F	8 03 16 13 20 9 20	8,710?	
526 11th	ePZ SNE? F	22 50 32 52 22 23 52	1,040?	
528 12th	ePNEZ iSNE F	8 28 35 31 34 51	1,700	
529 12th	iPZ ePE iSN F	12 17 49 49 27 42 13 44	8,490	Compression.
532 13th	ePNEZ SNEZ F	20 07 01 38 25	260	
533 14th	ePEZ SN LNE MNE F	9 06 36 11 06 13 29 15 25 10 30	2,810	
534 14th	ePNEZ SN? F	13 15 42 19 55 14 00	2,590?	Felt in northern Luzon.
538 15th	eP?Z iZ iN SNE F	21 58 38 59 28 36 22 06 42 0 20	6,520?	
539 16th	iPZ ePNE iSNE MN F	7 19 26 36 22 04 25 ca 9 00	1,520+	Dilatation. Deeper than normal. Butuan, more than 660 Km. Netherlands East Indies.
542 17th	ePNEZ SNE LE F	19 32 01 41 37 55 15ca 20 27	8,155	
543 18th	iPZ ePNE iSNEZ F	1 10 28 28 12 48 45	1,345	Compression.
547 19th	eNEZ F	3 42 ca 4 32		Trace.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
Sept. 1939				
550 19th	iPZ iS?N F	19 00 01 03 00 20	1,730?	
554 24th	ePNEZ iSNE F	3 32 10 37 26 4 19	3,680	
556 25th	ePNEZ SN LN MNE F	15 36 48 41 26 44 40ca 46 25ca 16 35	3,090	
558 25th	ePNEZ SE ME F	21 13 04 18 06 24 ca 22 05	3,455	
559 25th	ePNEZ SNE F	22 21 50 22 07 26	135	
560 27th	ePNEZ SNE F	10 16 13 37 26	190	
562 29th	ePNZ iSNEZ F	14 27 25 28 25 52	510	Felt in northern Luzon.
563 30th	ePNZ iSNE F	16 25 46 28 24 54	1,520	

Thirty-one insignificant or undecipherable disturbances on the following days of September: 1st, 5th, 6th(2), 7th(2), 9th(2), 11th(3), 12th, 13th(2), 14th(2), 15th, 17th(2), 18th(3), 19th(2), 20th, 22nd, 23rd, 24th, 25th, 28th, and 30th.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.



$\phi=14^{\circ} 34' 42''$ N. $\lambda=120^{\circ} 58' 41''$ E. $h=3$ m. Alluvium.

CONSTANTS OF THE
GALITZIN-WILIP

CONSTANTS OF THE WIECHERT
INVERTED PENDULUM. $M=955$ Kg.
October 1, 1939.

	T_1	T	μ^2	V_s
N-S	12.6	12.9	0	400
E-W	11.8	11.9	.08	229
Z	11.6	9.0		

	T_0	V	ϵ	$\frac{I}{T_0^2}$
N-S	4.3	200	2.7	0.099
E-W	4.2	258	2.6	0.066

Cf. Theoretical Seismology.
Schoen, S.J.

No. and Date	Phase.	Greenwich Time			Dist. Km.	Remarks.
		h.	m.	s.		
Oct. 1939						
565 1st	ePNE SNE F	4	15	48 18 08 40	1,350	
566 1st	ePNE SNE F	7	44	26 51 50	195	
572 3rd	1PZ 1SE F	11	17	28 21 40 12 30	2,710	
573 3rd	1PZ 1SE F	12	47	11 51 23 14 20	2,710	
577 5th	1PZ 1SNE F	15	12	54 18 17 40	3,790	Dilatation.
580 10th	ePNEZ SNEZ F	9	03	45 04 11 10	200	Disturbed by microseisms. Baguio, 85 Km.
581 10th	ePNEZ 1SNE LNE MNE F	18	38	14 43 21 49 20ca 52 ca 20 35	3,355	Disturbed by microseisms. Compression?
582 11th	ePNEZ SNEZ F	23	45	33 54 51	165	

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.



No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
Oct. 1939				
587 15th	ePNEZ SNE F	19 15 14 29 19	115	Felt at Iba, Zambales.
588 17th	ePNE pP iSNE MNE F	6 31 30 32 14 39 02 52 40ca 9 35	5,945	Z component not recording. h probably 200 Km by Brunner chart △ probably 6,220 Km. New Hebrides by Riverview and Manila. Riverview reports h more than 200 Km.
589 19th	iPNEZ iSNEZ F	6 26 47 27 04 40	135	Dilatation from SE. Deeper than normal. Slightly felt in Manila, Batangas, and Mindoro.
593 21st	PNEZ SNEZ F	22 46 10 22 50	95	
594 22nd	PNZ SN F	14 46 23 52 20 15 32	4,330	
596 24th	PNEZ S?NE F	9 04 22 06 17 10 10	1,000?	Butuan, 230 Km. Deeper than normal.
597 26th	ePNEZ SNE F	0 35 49 36 00 40	85	
598 26th	ePNEZ SNEZ F	2 52 55 53 06 56	85	
599 26th	P?NEZ SNEZ F	8 00 04 02 55 27	1,645?	
602 27th	ePNEZ SNE F	10 19 18 20 06 35	700	Felt at Batanes Islands.
605 29th	ePEZ SNE F	0 22 14 24 12 40	1,130	Felt at Davao.
606 29th	ePEZ SNE LNE F	0 50 18 54 11 56 30ca 2 00	2,430	
609 30th	eNE F	3 51 34 52	5.5	Trace of the small shock felt in Santa Escolastica street, Pasay.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.



No. and Date	Phase	Greenwich Time h. m. s.	Dist. Km.	Remarks.
Oct. 1939 610 30th	ePNE SNE F	4 01 10 45 13	250	
611 30th	eNE F	4 50 43 52	5.5	Trace of the small shock felt in Santa Escolastica street, Pasay.
612 30th	ePNZ SNEZ F	5 25 01 22 30	165	
613 30th	iPZ ePNE SNE	13 23 44 44 33 00	7,800	Dilatation. Deeper than normal.
614 30th	iPZ SNEZ F	13 53 21 48 14 20	210	#613 still recording. Felt at Baguio and San Fernando Union. Baguio, 15 Km.
615 30th	ePNEZ SNE F	17 46 06 49 50 18 15	2,300	

Twenty-six insignificant or undecipherable disturbances on the following days of October: 2nd(3), 3rd(3), 4th, 5th, 7th, 9th, 12th(4), 20th, 21st(2), 24th, 26th(2), 27th, 28th, 29th, 30th(2), and 31st.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.



$\phi=14^{\circ} 34' 42''$ N.

$\lambda=120^{\circ} 58' 41''$ E.

$h=3$ m.

Alluvium.

CONSTANTS OF THE GALITZIN-WILIP

	T_1	T	μ^2	V_s
N-S	12.6	12.9	0	400
E-W	11.8	11.9	.08	229
Z	11.6	9.0		

CONSTANTS OF THE WIECHERT INVERTED PENDULUM, $M=955$ Kg. November 1, 1939.

	T	V	ϵ	r/T_0^2
N-S	4.5	189	2.5	0.094
E-W	4.0	287	2.5	0.084

Cf. Theoretical Seismology. Schon, S.J.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
Nov. 1939				
619 1st	eP?NEZ SNE LNE	6 17 25 25 50 37 ca	6,870?	Disturbed by microseisms. Region of New Hebrides by Riverview and Manila.
620 1st	eP?NEZ SNE F	7 27 19 30 26 50	1,830?	No. 619 still recording. Disturbed by microseisms.
621 1st	ePNE SNE F	20 04 09? 08 18? 40	2,535	Disturbed by microseisms. Felt at Guam at 19:59:07 GMT. $\Delta=180$ Km. Deeper than normal.
622 3rd	ePNEZ SNE F	6 29 25 30 33 48	600	Felt in south Negros.
625 4th	ePNEZ S?NE F	10 26 45 35 12 11 30	6,910?	
626 5th	ePNEZ SNE F	8 12 36 16 05 30	2,100	
627 6th	1PZ 1PNE SNE F	7 56 42 43 37 08 40	200	Dilatation.
628 7th	ePNEZ SNEZ LNE F	2 01 12 03 29 04 55ca 28	1,320	
629 7th	ePNEZ SNEZ LNE MNE F	3 55 50 58 13 59 30ca 4 00 50ca 5 10	1,380	
630 8th	1PEZ SE F	2 05 56 08 55 27	1,530	Compression.

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SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
Nov. 1939.				
631 8th	ePNEZ SNEZ F	17 19 07 29 31	175	
632 8th	eP?NE SN LN MN F	17 35 49 43 50 54 ca 59 10ca 18 46	6,480?	
634 9th	ePNEZ SNE F	9 28 54 33 02 10 00	2,640	
635 9th	ePNEZ SNE F	16 11 10 15 04 17 25	2,440	Felt in Guam. 16:06:11 GMT. $\Delta=180$ Km. Deeper than normal.
638 10th	e SNE LN F	17 03 14 11 19 20 15ca 18 10		P lost in microseisms.
639 10th	ePNEZ SNE LN F	20 27 54 33 40 38 ca 21 30	3,980	Western New Guinea by Manila and Riverview.
641 12th	ePNEZ SNEZ F	22 59 51 23 01 57 32	1,210	
648 15th	ePNEZ iSNE F	22 27 17 36 30	150	
649 17th	iPZ SNE ME F	9 09 00 11 52 15 30ca 43	1,695	Dilatation.
650 17th	iPZ ePNE SNE F	18 49 48 48 58 08 19 19	6,680	Dilatation.
651 18th	ePZ SE F	0 23 50 32 29 1 20	7,110	
652 18th	iPZ ePNE SNE LNE F	1 41 17 17 48 07 55 30ca 4 20	5,230	Compression.
654 19th	ePNEZ SNE F	8 54 32 56 23 9 15	1,050	



M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY, --Continued.



No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
Nov. 1939 655 20th	PE SE ME F	6 28 57 31 00 34 ca 7 04	1,190	No record on N Component.
658 21st	iPNEZ SN? LN MNE F	11 10 16 17 10 24 10ca 30 10ca 12 50	5,165?	Compression from SW. 10° N: 60 E. h=200 by USCGS.
659 21st	ePZ SNE MNE F	21 29 01 34 05 40 30ca 22 28	3,490	
661 22nd	iPNEZ SNE F	10 22 07 27 11 10	160	Dilatation. E by N. Deeper than normal. Felt in Manila with intensity IV. S from the Wiechert and Horizontals.
665 23rd	ePNE SNE F	12 03 20 04 15 15	1,090	
666 24th	ePNEZ SNE LNE	23 32 33 41 37 55 ca	7,530	Disturbed by microseisms.
25th	MNE F	0 00 ca 2 00		
667 25th	ePNEZ SNE F	6 55 47 7 00 27 40	3,120	
670 30th	iPZ ePNE iSNE F	9 58 20 20 58 48	280	Dilatation.

Twenty-three insignificant or undecipherable disturbances on the following days of November: 1st, 3rd(2), 8th, 10th(2), 12th, 13th, 14th(2), 15th(3), 18th, 20th, 21st, 22nd, 23rd(3), 26th, 29th, and 30th/

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.



$\phi=14^{\circ} 34' 42''$ N.

$\lambda=120^{\circ} 58' 41''$ E.

h=3 m.

Alluvium.

CONSTANTS OF THE GALITZIN-WILIP

CONSTANTS OF THE WIECHERT INVERTED PENDULUM. M=955 Kg. December 1, 1939.

	T_1	T	μ^2	V_s
N-S	12.6	12.9	0	400
E-W	11.8	11.9	.08	229
Z	11.6	9.0		

	T_0	V	ϵ	$\frac{F}{T_0^2}$
N-S	4.3	205	2.6	0.089
E-W	4.1	270	2.7	0.077

Cf. Theoretical Seismology. Schon, S.J.

No. and Date	Phase.	Greenwich Time			Dist. Km.	Remarks.
		h.	m.	s.		
Dec. 1939						
675 7th	iPZ ePNE SNE F	17	27	49	160	Dilatation from SE. Felt at Boac, Marinduque and at Odoingan.
				49		
				28 09		
				45		
681 16th	iPZ ePNE SNE LNE F	10	53	41	4,100	Dilatation. 41.9° N: 147.3° E USCGS.
				42		
				59 24		
				11 04 20ca		
				12 10		
682 17th	ePNEZ SE F	0	40	17	610	
				41 26		
				1 05		
683 17th	iPZ SN F	7	53	55	3,180	
				58 39		
				8 17		
684 18th	P?EZ S?N F	10	28	22	3,890?	Disturbed by microseisms.
				33 51		
				11 00		
686 19th	iPEZ ePN SNEZ F	21	44	53	150	Dilatation?
				53		
				45 12		
				53		
688 20th	ePNEZ SNE F	20	25	13	1,820	
				28 19		
				37		
689 21st	ePNEZ SNE F	10	21	43	1,465	
				24 15		
				42		

M A N I L A , P . I .



SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
Dec. 1939				
690 21st	iPZ ePNE SNE	21 04 03 03 06 53	1,635	Dilatation. Destructive in Menado, Celebes. Wiechert pens disjointed at 21:05:50. S from the Horizontals.
22nd	F	0 47		Felt in Sulu and S Mindanao. Near 0.5° N: 124° E.
691 22nd	iPZ ePNE F	5 03 39 39 7 15		Compression. Long distance?
692 22nd	ePNEZ SNE? F	21 04 14 07 48 22	2,165?	
693 23rd	iPZ ePNE SNEZ F	2 58 46 46 3 01 35 20	1,625	Dilatation.
695 23rd	iPEZ SNEZ F	21 02 58 05 46 20	1,620	Dilatation.
697 25th	iPZ ePNE SNE LN MN F	16 32 22 22 37 13 40 40ca 44 ca 17 20	3,290	
698 25th	iPZ ePNE SNE F	20 59 37 59 37 21 02 31 23	1,645	Compression.
699 25th	ePNEZ SNE F	22 26 31 29 22 46	1,645	
700 26th	ePNEZ SNE F	2 14 51 17 06 30	1,300	
701 26th	ePNEZ SNEZ F	10 06 15 09 20 37	1,435	
703 27th	iPZ ePNE SNE MNE	0 09 03 03 18 48 44 ca	8,400	Dilatation?



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SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time			Dist. Km.	Remarks.
		h.	m.	s.		
Dec. 1939 704 27th	iPZ ePNE iSNEZ	3	07	35	2,755	Dilatation. Deep Focus. No. 703 still recording.
				35		
			11	51		
705 27th	ePNEZ SNE F	21	24	29	1,390	
				26 53		
				47		

Sixteen insignificant or undecipherable disturbances on the following days of December: 1st, 5th(2), 10th(3), 11th, 15th, 19th, 20th, 23rd, 24th, 26th, 28th(2), and 31st.

CORRECTED READING.

May 8, 1939, #270.

ePN	2	02	15
P ₁ E		06	45
PPNE		07	03
SKPE		08	29
SKSNE		12	36
PSNE		16	45
PPSNE		18	14
SSNE		23	31
SSSNE		28	07
LNE		43	ca
MNE		53	ca

May 19, 1939, #302.

ePEZ	18	45	37	18,790	New energy comes in at 19:09:00.
PPP?		55	12		
PSKS	19	01	08		No L or M waves.
SS?		17	46		