

Year 1917, No. 1.

January 1st to 11th, 1917.

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 static Pendulum (1,000 Kgs.)

International
Seismological
Centre

	T_0	ξ	$\frac{-\xi}{T_0^2}$
A_N	5.1	2.634	0.048
A_E	5.2	1.968	0.048

No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
1	1	I _v	eP F	14	43	31 46					
2	4	I _v	eP L M _E M _N F	9	03	49 05 00 05 09 05 13 17	4 3	22	21		Borongan (E Samar).
3	4	II _r	eP S L M _E M _N F	16	52	34 54 35 56 28 57 29 59 59 17 56	10 13	52	71		Formosa.
4	6	I	e F	18	10	32 27					
5	7	I _r	e L M _E F	4	14	45 19 24 22 02 38	10		5		N of Formosa.
6	7	I _v	eP L F	21	45	25 45 43 48					
7	10	I _v	eP F	3	17	21 20					
8	10	II _v	eP L M _N M _E F	13	21	05 22 00 23 19 23 19 47	5 7	108	133		Western Visayas.
9	10	I _v	eP L M _E F	15	26	00 23 47 27 44 37	6		8		
10	11	I	e F	11	49	3 12 00					



Year 1917, No.2.

January 11th to 24th, 1917.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY,--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
11	11	Iv	eP L F	16	10	44 11 06 14					
12	13	Iv	iME F	20	58	09 59	1		8		
13	14	Iv	eP L MN ME F	16	17	11 17 27 17 40 17 42 24	2 3	37	27		
14	14	Iv	eP F	18	38	41 40					
15	17	Iv	eP S L ME MN F	2	42	51 ? 46 22 47 18 47 29 3 13	7 7	33	34		
16	19	Iv	eP F	23	46	56 50					
17	20	II _r	eP S L ME MN	23	17	00 21 07 24 42 26 42 26 57	8 7	78	152		Lombok and Bali Is-lands. End overtaken by following earth-quake.
18	20 21	I _r	eP L F	23	54	30 0 00 16 25					
19	23	Iv	eP L F	12	47	29 47 50 50					
20	23	Iv	eP L	18	34	44 35 10					End overtaken by fol- lowing earthquake.
21	23	Iv	eP L MN F	18	36	52 37 20 37 41 44	2	22			
22	24	I _r	eP S L MN ME F	0	52	37 55 57 59 40 1 01 36 01 50 42	13 15	31	27		China.

Year 1917, No.3.

January 25th to 31st, 1917

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char- acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_H μ	A_E μ		
23	25	I _v	eP F	2	53	22 56					
24	25	I _v	eP L MN ME FE	3	29	24 30 33 40 36	4 3	22	18		
25	26	I	e F	5	19	28 58					
26	27	I _r	eP S L ME FE	14	55	38 58 06 13 47 48	11		7		Formosa.
27	28	I	e F	10	17	43 43					
28	28	I	e F	13	57	45 23					
29	28	I	e F	23	20	38 42					
30	30	II _r	eP S L iE MN1 ME1 MN2 ME2 MN3 ME3 F	2 3	54 01	54 36 08 04 42 49 13 36 17 24 24 37	7 11 15 16 17 17 16	87 126 196	135 135 120 341		
31	31	III _r	eP S L MN ME FE	4	02	42 30 10 56 55 43	5 5	373	429		S Mindanao.

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 static Pendulum (1,000 Kgs.)

	T_0	ϵ	$\frac{r}{T_0^2}$
A_N :	5.1	2.634	0.048
A_E :	5.2	1.968	0.048

No.	Date	Char-acter	Phase	Greenwich mean time			Amplitude		Δ	Remarks.
				R.	m.	s.	A_N μ	A_E μ		
32	3	I_v	eP L F	17 59 48 18 01 33 18						
33	4	I_v	e F	9 49 49 56						
34	4	I_v	eP L M _N M _E F	10 30 22 32 03 32 21 32 36 11 09	6 5		54	76		SE Mindanao.
35	4	I_v	eP F	17 59 01 18 01						
36	5	I_r	eP S L M _N F	12 21 18 23 09 25 24 25 43 37	5		57			
37	7	I_v	eP F	1 02 55 12						
38	12	I_r	e L F	9 12 48 21 00 46						
39	16	I_v	eP F	7 18 08 20						
40	17	I_v	eP L M _E F	22 49 22 50 30 52 20 23 22	4			79		Batanes Islands and Luzon.
41	18	II_v	eP L M _E M _N F	1 24 34 25 53 27 37 27 56 2 40	5 5		328	332		Eastern Visayas.

Year 1917, No.5.

February 18th to 25th, 1917.

MANILA, P. I.

International
Seismological
Centre

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
42	18	I _v	eP F	21	16	05 19					
43	19	I _v	eP F	10	37	44 41					
44	20	I	e F	15	17	49 33					
45	20	I _u	e S L? F	20	06	24 ? 58 31 21 36					
46	21	I	e F	14	07	14 18					
47	22	I _v	eP L ME MN F	16	58	41 59 11 59 18 59 34 17 12	3 4	179	82		SE Luzon.
48	24	I _v	eP L ME MN F	9	31	13 32 06 32 16 32 35 44	3 3	31	19		N Luzon.
49	25	II _v	eP L ME MN	5	21	34 22 39 23 48 24 02	6 8	812	523		SE Luzon, Samar and Leyte. End overtaken by following earth- quake.
50	25	III _v	eP L ME MN F	5	47	10 48 02 48 51 48 51 7 27	5 5	926	788		SE Luzon, Samar and Leyte.
51	25	II _v	eP L ME MN	10	08	19 09 11 09 45 09 45	4 4	104	92		SE Luzon, Samar and Leyte. End overtaken by following earth- quake.
52	25	I _v	eP L ME MN F	10	34	38 35 14 35 27 35 29 11 16	2 3	94	77		N Luzon.

MANILA, P. I.



SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
53	25	I _v	eP L M _E F	14	09	05 44 11 27	4		5		
54	26	I _v	eP L M _N F	8	10	11 46 18 26	4	40			
55	26	I _r	eP L M _E F	10	01	26 04 47 23	7		12		
56	26	I _v	eP F	13	29	09 34					
57	26	I _v	MP F	15	28	54 36					
58	27	I _v	eP F	4	17	26 26					

Miguel Saderra Masó, S. J.,
Cheif, Seismic and Magnetic Divisions, Weather Bureau.

Year 1917, No. 7.

March 1st to 8th, 1917.

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 static pendulum (1,000 Kgs.)

	T_0	ξ	$\frac{\xi}{T_0^2}$
A_N :	5.1	2.634	0.008
A_E :	5.2	1.968	0.048

No.	Date	Char-acter	Phase	Greenwich mean time	Period	Amplitude		Δ	Remarks.
						A_N μ	A_E μ		
				h. m. s.					
59	1	I_v	eP F	9 03 54 12					
60	2	I_r	e F	0 54 56 1 03					
61	2	II_v	eP L M_L M_E F	2 40 11 41 00 41 32 41 53 3 05	5 4	127	92		SE Luzon.
62	3	I_v	eP F	8 39 35 43					
63	4	I	e F	5 56 53 6 14					
64	4	I_v	eP L F	13 01 14 01 33 05					
65	5	I_v	eP F	4 45 41 56					Basco (Batanes Islands)
66	5	I_v	eP F	5 46 32 6 00					
67	5	I_v	eP F	7 36 42 39					
68	6	I	e F	3 25 09 42					
69	8	I_r	e F	16 40 02 17 03					
70	8	I_v	eP F	21 25 17 28					

Year 1917, No.8.

March 9th to 20th, 1917.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.---Continued.

No.	Date	Char- acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
71	9	I _v	eP S L M _E M _L F	12	03	45 05 14 07 24 07 29 07 42 25	3 4	25	36		
72	9	I _v	eP L M _L M _E F	23	03	10 04 13 05 02 05 21 17	3 3	16	8		Basco (Batanes Islands)
73	12	I _v	eP F	0	29	21 31					
74	12	I _v	eP L M _E M _L F	9	08	00 08 25 08 50 08 52 17	3 3	43	34		
75	13	I _v	eP F	14	04	42 07					
76	15	I _r	e S L M _L M _E F	0	21	00 27 16 33 25 39 09 39 38 1 44	13 13	25	15		
77	16	I _v	eP L F	17	15	13 15 36 18					
78	17	II _v	eP L M _L M _E F	23	25	18 26 19 26 44 26 44 51	6 5	157	95		Eastern Visayas.
79	19	I _v	eP F	17	38	51 54					Butuan (N Mindanao).
80	20	I _v	eP L F	15	02	00 03 29 11					NE Mindanao.
81	20	I _v	eP L F	18	43	37 45 05 52					NE Mindanao.

Year 1917, No. 9.

March 20th to 31st, 1917.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char- acter	Phase	Greenwich mean time			Amplitude		Δ	Remarks.
				h. m. s.			A_N μ	A_E μ		
82	20	I _v	eP F	23	55	13 58				
83	21	I	e F	13	39	27 14 02				
84	22	I _v	eP F	19	37	06 43				
85	27	I _v	eP L M _N F	0	55	29 56 04 56 08 1 02				

Miguel Saderra Masó, S. J.,

Chief, Seismic and Magnetic Divisions, Weather Bureau.

Year 1917, No. 10.

April 1st to 10th, 1917

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 static Pendulum (1,000 Kgs.)



	T_0	ϵ	$\frac{\epsilon^2}{T_0^2}$
A_N	5.1	2.634	0.048
A_E	5.2	1.968	0.048

No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
86	1	I_v	eP L F	16	33	45 34 00 37					
87	2	I_r	eP S L M_N M_E F	7	57	33 59 48 8 01 41 02 14 02 33 20	6 4	8	10		
88	3	I_r	e F	12	42	13 13 22					
89	3	I_v	eP F	15	41	58 44					
90	9	I_v	eP L M_E F	5	16	28 16 46 16 51 23	2		75		
91	9	III_v	eP L	11	12	11 12 47					Ilocos Norte (NW Lu- zon). Maxima and end in both components lost by the force of the shock
92	9	II_v	eP L M_N F	11	22	20 23 14 23 18 33	4	54			Ilocos Norte (NW Luzon).
93	9	I_v	eP L F	15	52	30 53 23 16 00					Ilocos Norte (NW Luzon).
94	10	I_v	eP L M_N F	13	34	58 35 46 36 02 50	4	12			Western Visayas.
95	10	I_v	eP L M_N F	16	44	10 44 53 45 14 56	2	10			Western Visayas.

No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
96	11	I_v	eP L M_N F	22	02	06	4	52			N Luzon.
				23	14						
97	12	I_r	e S L M_N M_E F	3	01	16	18 17	8	12		
					06	18					
					10	55					
					12	24					
					12	29					
					43						
98	14	I_r	eP L M_N F	11	12	34	4	33			
					15	00					
					15	17					
					28						
99	16	I_r	e S L M_E F	18	51	00	15		4		
					55	50					
				19	02	26					
					02	52					
					26						
100	17	I_r	e L M_N F	13	37	49	11	6			
					45	06					
					46	09					
				14	04						
101	17	I_v	eP L F	19	54	44					
					55	40					
				20	06						
102	18	I_v	eP F	12	52	41					
					56						
103	19	I_v	eP F	4	19	00					
					24						
104	21	I_r	e F	0	58	36					
					41						
105	21	I_v	eP F	11	58	43					
				12	02						
106	22	I_r	e F	6	35						
				7	03						
107	23	I	e F	0	38	20					
				1	11						
108	23	I_v	eP L M_N M_E F	20	33	36	2 2	108	78		Eastern Luzon.
					34	04					
					34	07					
					34	07					
					42						

Year 1917, No.12.

April 24th to 30th, 1917.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude			Remarks.
				h.	m.	s.		AE μ	AE μ		
109	24	I _v	eP L F	1	41	56					Butuan (N Mindanao).
					44	51					
				2	02						
110	25	I _r	eP S L F	7	48	22					
					51	14					
					53	09					
				8	16						
111	25	I _v	eP F	14	19	38					
					26						
112	25	I _v	eP F	21	18	26					
					26						
113	26	I _r	e F	17	44	18					
					56						
114	26	I	e F	23	55	00					
	27			0	09						
115	28	I	e F	14	01	00					
					17						
116	29	I _v	eP F	8	08	00					
					10						
117	29	I _v	eP F	11	46	34					
					52						
118	29	I _r	e S L M M F	12	03	29					
					09	36					
					18	52	14	9			
					22	38	15		9		
					23	16					
					58						
119	29	I _r	e M F	15	42	25					
					52	14	12		3		
				16	05						
120	30	I _v	eP F	9	24	40					
					28						

Year 1917, No.13.

May 1st to 5th, 1917.

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 static Pendulum (1,000 Kgs.)



	T_0	ϵ	$\frac{r}{T_0^2}$
A_N	5.1	2.634	0.048
A_E	5.2	1.968	0.048

No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
121	1	Iv	eP F	10	52	08 56					
122	1	Iv	eP F	11	14	04 11 19					
123	1	Iv	eP F	16	28	01 32					
124	1	IIIu	e P S L LE1 LN1 LN2 ME2 ME3 MN3 ME4 LN4 ME5 LN5 ME6 LN6	18	38	12 38 21 49 09 19 01 07 01 48 02 48 05 02 05 13 07 49 12 48 13 53 17 41 20 28 22 47 23 29 26 40					Near Tonga Island. End overtaken by following earthquake.
							17		55		
							20	52			
							23	49			
							22		34		
							19		59		
							19	31			
							17		38		
							23	39			
							16		48		
							15	39			
							16		37		
							16	31			
125	1	I	e	20	36	17					End overtaken by following earthquake.
126	1	Ir	e F	21	03	19 22 20					
127	4	Iv	eP L LN F	0	14	24 15 05 15 10 26	4	78			N Luzon.
128	4	Ir	e F	0	54	49 1 39					
129	5	Iv	eP L LN F	12	20	21 21 05 22 28 34	4	42			Laoag (NW Luzon).

Year 1917, No.14.

May 6th to 13th, 1917.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char- acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_H μ	A_E μ		
130	6	I _r	eP S L M _N F	23	00	49 51 57 36 02	9	72			
131	7	I	e F	8	18	21 43					
132	7	I _v	eP F	11	34	31 37					
133	7	II _v	eP L M _N F	17	58	38 08 14 19	2	418			NW Luzon.
134	7	I _v	eP L F	21	01	59 36 08					
135	8	I _v	eP L M _E F	9	07	31 46 54 19	3		87		
136	8	I _v	eP F	16	15	49 18					
137	9	III _r	eP S L M _N M _E F	16	00	00 06 15 34 37 04	8 7	1,172	533		Guam (Mariana Is- lands).
138	9	I _v	eP F	21	53	42 58					
139	9	I _v	eP F	22	00	32 08					
140	11	I _v	eP F	15	23	43 27					
141	12	I _v	eP L M _E F	4	31	43 37 35 56	4		141		
142	13	I _v	eP F	14	45	57 49					

Year 1917, No.15.

May 14th to 23rd, 1917.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
143	14	I _r	eP S L M _N F	22	10	51 15 05 19 15 21 00 54	9	8			
144	15	I _v	eP L M _N F	9	04	37 05 06 05 15 15	2	12			
145	16	II _v	eP L	8	55	36 55 51					Maxima and end lost by the pens thrown off by the force of the shock.
146	17	I	e F	19	12	16 19					Japan.

	T_0	ϵ	$\frac{r}{T_0^2}$
A_N	5.9	2.340	0.024
A_E	5.3	1.783	0.092

147	18	I _v	eP L M _E F	23	25	43 25 57 25 58 28	2		51		
148	23	II _v	eP L M _N M _E	13	20	44 21 07 21 11 21 17	3 3	185	130		End overtaken by fol- lowing earthquake.
149	23	I _v	eP	13	28	50					End overtaken by fol- lowing earthquake.
150	23	I _v	eP F	13	30	06 39					
151	23	I _v	eP L M _E M _N F	14	11	07 11 29 11 32 11 39 23	2 2	135	131		

Year 1917, No.16.

May 23rd to 27th, 1917.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A μ	A μ		
152	23	I _r	eP S L M N F	21	50	18 54 07 22 00 05 01 54 28	8	9			
153	23	I _v	eP L M F	23	21	25 21 46 21 49 32	2		71		
154	24	I _r	eP F	10	14	48 34					
155	24	I _v	eP L M N F	18	31	02 31 20 31 23 31 23 40	2 2	198	256		
156	24	I	e F	19	31	40 20 12					
157	25	I	e F	7	10	29					
158	25	I _v	i F	10	12	22					
159	26	I _v	eP L M F	21	16	39 17 33 18 08 35	6	29			Sanar Island.
160	27	I _v	eP L M F F F F	20	04	48 05 19 05 26 05 38 15	2 2	87	85		Laoag (NW Luzon).

Year, 1917, No. 17.

May 28th to 31st, 1917.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char- acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A μ	A μ		
161	28	I _v	eP F	8	32	27 37					
162	28	III _d	eP L M ₁ F	12	02	26 53 06 28	3	1,364			SE Luzon. Maximum and end in E-W component lost by the force of the shock.
163	28	I _r	eP S L F	13	40	53 00 33 56					
164	29	I _r	eP L F	6	13	10 00 59					
165	29	I _v	eP F	8	32	02 35					
166	31	II _u	eP S L M ₁ M ₁ M ₁ M ₁ M ₁ F	8 9	58 08	55 22 20 34 42 39 12 58	23 21 23 23	41 28	29 32		
167	31	I _v	eP F	13	51	36 55					

Miguel Saderra Masó, S. J.,

Chief, Seismic and Magnetic Divisions,
Weather Bureau.

Year 1917, No.18.

June 1st to 8th, 1917

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 static Pendulum (1,000 Kgs.)



	T_0	ξ	$\frac{\xi}{T_0^2}$
A_N	5.9	2.340	0.024
A_E	5.3	1.783	0.092

No.	Date	Char-acter	Phase	Greenwich mean time	Period	Amplitude		Δ	Remarks.
						A_N μ	A_E μ		
				h. m. s.					
168	1	I_r	e F	8 31 22 9 34					
169	1	I_v	eP F	16 45 12 48					
170	3	I_r	eP S? L? F	14 38 36 41 58 44 19 15 15					
171	4	I_r	e F	1 41 00 2 14					
172	4	I_v	eP F	5 46 04 49					
173	4	I	e F	7 55 36 8 22					
174	5	I_v	eP L F	20 58 33 59 23 21 07					Sanar and Panay Is-lands.
175	6	I_v	eP L MN F	9 31 58 33 39 34 30 52	4	17			Butuan (Mindanao).
176	6	I_v	eP F	22 39 25 44					
177	7	I	e F	16 11 32 24					
178	7	I	e F	19 35 50 57					
179	8	I_u	e S? L MN ME F	1 11 29 20 2 01 52 03 29 05 00 3 04	22 23	5	4		

May 1917, No.19.

June 8th to 18th, 1917

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.



No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_H μ	A_E μ		
180	8	I _v	eP F	20	16	37 19					
181	9	II _v	eP L LN ME F	6	33	19 07 18 22 47	3 3	170	139		N Luzon.
182	9	I _v	e F	17	09	34 24					
183	10	I	e	4	55						End overtaken by fol- lowing earthquake.
184	10	I _v	eP L F	5	47	02 21 52					
185	13	I _u	eP S L ME LN F	6 7	53 03	40 50 28 50 15 44	18 19	14	13		
186	13	I	e F	9	04	20 46					
187	13	I _v	eP L LN F	15	33	31 54 14 42	2	70			Baguio (W Luzon).
188	13	I	eP F	17	10	48 31					
189	14	I	eP F	21	03	39 06					N Luzon.
190	18	I _v	eP F	0	09	24 13					
191	18	I _v	eP F	1	25	00 34					
192	18	I _v	eP F	13	07	50 11					
193	18	II _v	eP L LN F	15	50	42 56 58 58	2	349			
194	18	I _r	eP L F	16	34	44 51 55					

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char- acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
195	18	I	e F	22	16	56 46					
196	19	I _v	eP F	23	34	49 37					
197	21	I	eP L F	17	48	20 50 11 18 06					
198	24	I _v	eP F	2	25	58 32					
199	24	I _r	eP S L ME MN F	20	00	12 05 08 10 54 11 02 11 05 21 02	7 9	47	16		
200	26	III _u	eP S L ME1 MN1 ME2 MN2 MN3 ME3 F	6	01	03 10 34 25 10 26 21 28 45 29 01 34 38 36 36 40 08 11 30	25 19 21 19 18 18	167 144 136	282 128 84		Saoa Island.
201	27	II _v	eP L ME ME F	5	36	48 37 50 37 58 38 37 6 04	2 2	54	77		SE Luzon, Samar and Leyte Islands.

Miguel Saderra Masó, S. J.,

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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 static Pendulum (1,000 Kgs.)

	T_0	ϵ	$\frac{F}{T_0^2}$
A_N	5.9	2.340	0.024
A_E	5.3	1.783	0.092

No.	Date	Char-acter	Phase	Greenwich		Amplitude		Δ	Remarks.
				mean time	Period	A_N μ	A_E μ		
				h. m. s.					
202	1	I	e F	0 50 1 22					
203	2	I _v	eP F	1 52 25 54					
204	2	I _v	eP L MN F	21 36 17 36 33 36 35 40	2	129			
205	4	III _r	eP S L MN1 ME1 MN2 ME2 F	0 41 06 44 04 45 55 46 10 46 36 47 24 48 14 3 20	8 10 8 10	1,106 1,144	987 1,192		Aparri (NE Luzon); distant earthquake.
206	4	II _r	eP S L MN1 ME1 ME2 MN2 F	5 39 18 42 56 44 35 45 06 45 48 46 44 48 44 7 22	13 12 12 12	189 144	179 192		
207	4	I _r	eP S L ME MN F	22 15 00 19 02 23 26 24 14 24 34 23 12	14 10	23	19		
208	5	I	e F	0 41 00 1 14					
209	5	I _v	eP F	9 59 20 10 01					

Year 1917, No.22.

July 7th to 21st, 1917.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
210	7	I _v	eP F	6	02	57 05					
211	8	I	e F	17	42	18 06					
212	9	I _v	eP F	9	36	10 39					
213	12	I _v	eP F	12	43	34 46					
214	14	I _v	eP F	20	11	37 14					
215	16	I _v	eP L M _N M _E F	5	12	14 52 55 56 23	2 2	58	56		SE Luzon.
216	17	I _v	eP F	19	16	39 20					
217	17	I _v	eP F	20	25	45 30					
218	18	I _r	e M _N F	7	59	8 07 18 42	11	17			
219	19	I _v	eP F	11	04	12 06					
220	20	I _v	eP F	15	28	24 30					
221	21	I _v	eP F	7	28	28 37					

Year 1917, No. 23.

July 22nd to 29th, 1917.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
222	22	I _r	e L? F	4	40						Near Guam (Mariana Islands).
					45	28					
				5	02						
223	24	II _v	eP L ME MN F	9	27	49					
					28	09					
					28	20	2		129		
					28	26	2	217			
					37						
224	25	I	e F	14	28						End overtaken by following earthquake.
				16	00						
225	27	I _u	eP S L ME MN	1	20	42					
					27	45					
					35	27					
					37	00	11		10		
					37	48	10	11			
226	27	I _v	eP F	2	59	51					
				3	02						
227	27	I _u	e F	3	12						
				5	20						
228	27	I _v	eP F	12	59	11					
				13	01						
229	27	I _r	e S L ME MN F	23	43						
					47	28					
					50	40					
					55	15	8	51			
					55	24	8		29		
	28		F	0	53						
230	29	I _v	eP F	12	11	24					
					14						
231	29	I _u	e S L ME MN F	14	39	16					
					46	00					
					52	11					
					53	28	18		13		
					54	58	15	19			
				16	04						
232	29	I _v	eP F	18	25	27					
					27						

Year 1917, No.24.

July 29th to 31st, 1917.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char- acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
233	29	III _r	eP	21	58	15					Distant earthquake.
			S	22	03	40					
			L		05	08					
			MN		05	20	7	1,167			
			ME		06	05	6		737		
	30		F	0	25						
234	30	I	e	0	36						
			F	1	10						
235	30	I	e	8	52						
			F	9	22						
236	30	I	e	13	56						
			F	14	25						
237	30	I	e	16	29						
			F	17	03						
238	30	II _r	e	23	58	55					
	31		S	0	02	44					
			L		04	30					
			ME1		05	42	8		250		
			LN1		08	00	10	326			
			LN2		10	12	10	439			
			ME2		10	40	10		562		
			F	1	24						
239	31	I _r	e	3	19	12					
			S		25	06					
			L		32	32					
			ME		33	06	6		167		
			ME		34	33	7	144			
			F	4	58						
240	31	I	e	8	52						
			F	9	31						

Year 1917, No. 25.

August 1st to 7th, 1917.



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' astatic Pendulum (1,000 Kgs.)

	T_0	ϵ	$\frac{\epsilon}{T_0^2}$
A_N	5.9	2.340	0.024
A_E	5.3	1.783	0.092

No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
241	3	I _v	eP F	10	10	47 13					
242	3	I _v	eP L ME MN F	18	35	51 37 21 37 52 38 31 58	5 7	109	103		Butuan (N Mindanao).
243	3	I _v	eP F	19	03	06 08					
244	3	I _v	eP F	19	29	53 34					
245	5	I _u	eP S L ME MF F	16	01	24 11 46 29 48 31 28 31 45 17 40	18 18	5	4		New Zealand ?
246	5	I _r	eP S L? ME F	18	41	05 43 05 46 00 46 26 19 17	9		25		
247	7	I _r	eP S L ME ME F	15	59	45 16 04 23 07 38 09 03 09 06 45	11 11	5	15		

Year 1917, No. 26.

August 8th to 17th, 1917.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				H/	m.	s.		A_N μ	A_E μ		
248	8	I _v	eP F	20	56	02 58					
249	8	I _v	eP F	23	25	55 30					
250	9	I _v	eP L ME F	11	56	25 57 41 12 08	5		73		SE Luzon and N Samar.
251	10	I _v	eP S L F	22	09	36 -- -- 12 32 32					
252	11	I _v	eP F	4	54	51 57					
253	12	I _v	eP F	7	31	38 35					
254	12	I _v	eP F	19	35	07 37					
255	14	I _v	eP L ME F	23	08	07 09 00 09 32 25	4	173			NE Luzon.
256	15	I _v	eP F	0	17	24 20					
257	17	I _v	eP L ME F	0	15	28 15 50 15 59 20	3	167			
258	17	I _v	eP F	4	33	05 35					
259	17	I _v	eP F	9	49	42 52					
260	17	I _v	eP F	13	25	55 28					

Year 1917, No. 27.

August 18th to 31st, 1917.



MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
261	18	I _v	eP F	6	49	19 52					
262	18	I _v	eP F	19	41	00 43					
263	18	I _v	eP F	19	44	47 46					
264	18	I _v	eP F	20	06	32 12					
265	21	I _r	eP S? L? M _E F	15	27	53 30 54 56 49	4		51		
266	21	I _v	e F	17	20	52 29					
267	23	I _v	eP F	2	31	30 33					
268	25	I _v	eP F	20	50	14 52					
269	27	I	e F	0	12	48 36					
270	30	III _v	eP L M _N F	4	12	15 33 49 ?	5	1,076			Butuan (N Mindanao). Maximum in the E-W component lost by the force of the shock; also the end in both components.
271	31	I _v	eP F	5	46	48 51					
272	31	II _v	eP L M _N M _E F	10	13	02 24 15 24 48	5 5	651	487		
273	31	I	e F	11	56	29 52					

Year 1917, No.28.

September 1st to 12th, 1917.

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 Kgs.)

	T_0	ξ	$\frac{\xi}{T_0^2}$
A_H :	5.9	2.340	0.024
A_E :	5.3	1.783	0.092

No.	Date	Char- acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
274	2	Iv	eP F	22	30	04 33					
275	3	Iv	eP F	10	08	30 10					Vigan (NW Luzon).
276	4	I	e L ME ML F	16	56	01 36 02 14 03 40 17 16	16 15	6	5		
277	7	IIIv	eP L	22	23	23 54					SE Luzon. Maxima and end lost by the force of the shock.
278	8	Iv	eP F	2	05	42 09					
279	8	Iv	eP L ML F	19	36	46 10 16 40	2	47			
280	8	Iv	eP F	21	36	22 40					SE Luzon.
281	9	I	e L F	1	07	13 02 34					
282	12	Iv	eP L ME F	9	57	30 43 10 00	2		45		

Year, 1917, No.29.

September 12th to 20th, 1917.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char acter	Phase	Greenwich mean time			Period.	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
283	12	I _v	eP F	23	31	34 35					
284	13	I _v	eP F	4	25	28 29					
285	13	I _v	eP F	11	55	05 57					
286	14	I _v	eP F	5	33	35 38					Naga (SE Luzon).
287	14	I _v	eP L ME MN F	15	33	03 18 22 23 41	5 5	223	192		
288	17	II _v	eP L ME FE F	5	48	39 19 58 16 10	4 5	773	712		N Luzon.
289	18	I _v	eP L F	13	41	36 52 04					Butuan (N Mindanao).
290	18	I _v	eP F	20	25	42 29					SE LUzon.
291	20	I _r	eP S L F	3	00	53 -- 00 57					
292	20	I _v	eP F	14	57	15 00					

Year 1917, No. 30.

September 21st to 30th, 1917.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char- acter	Phase	Greenwich mean time			Period.	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
293	21	I _r	eP L F	10	43	48 48 22 11 04					
294	21	I _v	eP L ME MN F	11	13	58 14 30 14 38 14 56 29	5 5	164	146		SE Luzon.
295	21	I _v	eP L ME MN F	23	32	21 32 44 32 46 32 46 42	5 5	144	60		
296	22	I _v	eP F	6	51	28 55					Candon (W Luzon).
297	23	II _v	eP L ME MN F	15	39	17 39 50 39 54 40 04 55	4 4	553	397		W Luzon.
298	24	I _v	eP F	11	16	31 21					
299	24	I _r	eP S L ME1 MN1 ME2 MN2 F	20	15	14 19 07 21 02 21 08 21 13 22 14 22 17 21 09	6 6 7 6	80 108	47 62		
3000	26	I _v	eP L ME F	9	41	26 42 03 42 10 52	4		73		

Year 1917, No.31.

October 1st to 4th, 1917.

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 Kgs.)

	T_0	ϵ	$\frac{r}{T_0^2}$
A_N	5.9	2.340	0.024
A_E	5.3	1.783	0.092

No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
301	1	I _v	eP L ME MN F	12	14	17 15 02 15 20 15 30 26	3 4	57	51		N. Luzon.
302	2	I _v	e F	17	16	35					Butuan (N Mindanao).
303	3	I _r	eP L ME MN F	7	20	15 22 46 23 02 23 22 42	7 9	75	39		
304	3	II _v	eP L ME MN F	23	38	44 39 18 39 26 39 37 0 11	5 5	744	295		SE Luzon.
305	3	I _v	eP F	23	53	47 56					SE Luzon.
306	4	I _v	eP L F	15	38	14 38 46 41					SE Luzon.
307	4	I _v	eP L F	22	39	06 39 41 44					SE Luzon.
308	4	I _v	eP F	23	08	05 11					SE Luzon.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char- acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A _T μ	A _E μ		
309	5	I _v	eP F	4	31	08 34					SE Luzon.
310	5	I _v	eP L ME ML F	11	08	00 33 41 51 19	5 5	136	89		SE Luzon.
311	5	I _v	eP F	11	49	54 53					SE Luzon.
312	5	II _v	eP L ME ML F	12	13	06 37 39 54 28	4 4	401	186		SE Luzon.
313	5	I _v	eP F	12	30	42 33					SE Luzon.
314	5	I _v	eP L F	15	16	44 17 20					SE Luzon.
315	5	I _v	eP F	22	49	04 52					SE Luzon.
316	6	I _v	eP F	1	07	04 10					SE Luzon.
317	6	I _v	eP L ME ML	7	04	00 34 40 52	5 6	174	118		SE Luzon. End over- taken by follow- ing earthquake.
318	6	I _v	eP L ML F	7	07	06 41 48 12	6	84			SE Luzon.
319	6	I _v	eP F	9	28	38 32					SE Luzon.
320	6	I _v	eP F	18	42	24 45					SE Luzon.
321	6	I _v	eP F	19	53	37 57					SE Luzon.

Year 1917, No.32.

October 7th to 25th, 1917.

MANILA, P. I.

International
Seismological
Centre

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char- acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
322	11	I _v	eP L ME MN F	22	43	47 55 03 05 49	3 3	267	237		
323	11	I _v	eP F	23	25	24 28					
324	14	I _v	eP L ME MN F	11	13	28 11 27 21	3	30			N Luzon.
325	14	I _v	eP F	14	50	20 53					
326	15	I _v	eP F	4	56	06 59					
327	15	I _v	e F	16	05	19					
328	16	I _v	eP F	14	47	02 50					Laoag (NW Luzon).
329	17	I _v	eP F	2	15	05 18					
330	17	II _v	eP L ME MN F	7	05	46 23 31 34 27	3 3	500	327		
331	17	I _r	e F	14	37	23 59					
332	18	I _v	eP L ME MN F	16	18	39 18 00 06 33	11 10	16	10		NE Mindanao.
333	25	I	e F	14	35	24 08					
334	25	I	e F	19	55	14 20					
335	25	I _v	eP F	23	32	40 35					

Year 1917, No.34.

October 25th to 31st, 1917.

MANILA, P. I.



International
Seismological
Centre

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude			Remarks.
				h.	m.	s.		AN 	AE 		
336	25	I _v	eP F	23	44	35 47					
337	26	II _v	eP L	6	11	07 11 24					Santa Cruz, Laguna (E Luzon). Maxima and end in both components lost by the force of the shock.
338	29	I _v	eP L S M _{N1} M _{N2} F	20	43	36 45 43 46 13 46 57 49 41 21 28	6 6	24 30			
339	30	I _v	eP L M _E M _N F	3	02	04 02 22 02 24 02 27 08	2 2	91	78		
340	30	I _v	eP F	22	39	00 41					
341	31	I	eP F	2	20	51 37					
342	31	I	eP F	15	13	28 26					
343	31	I _v	eP F	19	42	22 45					



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 Kgs.)

	T_0	Σ	$\frac{r}{T_0^2}$
A_N :	5.9	2.340	0.024
A_E :	5.3	1.783	0.092

No.	Date	Char-acter	Phase	Greenwich mean time			Amplitude		Δ	Remarks.
				h.	m.	s.	A_N μ	A_E μ		
344	1	Iv	eP L ME F	20	19	51 20 13 20 14 25		64		
345	2	I	eP L F	18	57	52 19 01 22 17				
346	3	Iv	eP L ME MN F	3	26	16 26 49 27 00 27 07 43		63		Naga (SE Luzon).
347	4	IIv	eP L ME ME F	11	49	04 49 39 49 44 49 50 12 00		119		
348	4	Ir	eP S L MN1 ME1 ME2 F	12	09	20 15 16 22 36 23 04 23 57 29 30 34 26 13 36		34		
349	4	Iv	eP F	14	31	18 34				
350	5	Id	eP L MN ME F	11	16	12 16 24 16 25 16 25 20		237		Manila (W Luzon).

Year 1917, No. 36.

November 6th to 14th, 1917.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char. acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		AN u	AE u		
351	7	Iv	eP L ME MN F	20	53	00 53 12 24 00	 4 4	 45	 29		N Luzon.
352	8	Iv	eP F	8	10	00 14					Legaspi (SE Luzon).
353	8	Iv	eP F	10	17	24 20					
354	8	Iv	eP L ME MN F	13	43	16 42 54 47	 4	 38			
355	9	Iv	eP F	7	28	44 32					
356	9	Iv	eP F	13	26	32 29					
357	9	Iv	eP F	21	35	06 37					
358	10	Iv	eP L ME MN F	0	02	55 19 31 08	 2	 26			Baguio (W Luzon).
359	10	I	e F	7	22	 36					
360	10	Iv	eP F	19	51	46 55					
361	11	Iv	eP F	8	01	39 05					
362	13	Ir	eP L ME MN F	20	01	30 14 18 26	 8	 59			Butuan (W Mindanao).
363	14	Ir	eP L ME MN F	5	10	29 19 44 36	 17	 8			

Year 1917, No.37.

November 14th to 20th, 1917.



MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char. acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		A_N μ	A_E μ		
364	14	I _r	eP L MN F	15	18	49 22 48 23 08 33	16	9			Butuan (N Mindanao).
365	15	I _r	eP L MN F	5	15	48 19 36 20 49 31	9	14			
366	16	I _r	eP iS eL ME1 MN1 MN2 ME2 F	3	31	12 41 06 56 00 56 29 57 11 59 28 4 00 07 6 24	18 23 19 17	15 24	13 15		
367	16	II _v	eP iS iL ME1 MN1 MN2 ME2 F	22	19	32 21 37 22 14 22 18 22 41 23 42 23 57 23 40	6 6 6 6	500 848	283 391		Eastern Mindanao.
368	17	I _v	eP F	12	49	24 13 01					Panay and Cuyo Islands.
369	18	III _v	eP iL	2	59	27 3 00 24					Sulu Sea. Maxima and end in both compo- nents lost by the force of the shock.
370	18	I _v	eP L ME F	9	29	50 30 35 30 40 36	4		37		
371	20	I _v	eP L ME F	3	56	14 57 41 58 16 4 10	3		26		Zamboanga (W Min- danao).
372	20	I _v	eP F	15	38	38 16 00					

Year 1917, No. 39.

December 4th to 20th, 1917.



MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char-acter	Phase	Greenwich mean time			Period	Amplitude			Remarks.
				h.	m.	s.		A _L μ	A _E μ		
385	5	I _v	eP L M _L F	22	13	00 21 23 18	3	62			
386	6	I _v	eP F	19	15	37 19					
387	7	I _v	eP F	13	32	27 35					
388	7	I _v	eP F	17	00	42 03					
389	8	I _v	eP F	9	29	35 32					
390	8	I _v	eP F	22	47	22 50					
391	9	IIIId	eP L	5	34	25 38					S Luzon. Maxima and end in both components lost by force of the shock.
392	9	I _v	eP L M _L F	21	26	24 42 46 30	3	198			
393	10	I _r	eP S L F	14	41	00 -- 26 18					
394	11	I _v	eP F	3	45	54 48					
395	14	I _v	eP F	2	26	48 29					
396	14	I _r	e F	8	10	32 56					
397	20	I _v	eP F	8	51	00 54					Naga (SE Luzon).

Year 1917, No.40.

December 21st to 31st, 1917.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No.	Date	Char- acter	Phase	Greenwich mean time			Period	Amplitude		Δ	Remarks.
				h.	m.	s.		μ	μ		
398	21	I _r	eP S L M M F	18	06	28 12 40 15 53 16 24 16 26 19 17	10 10	8	8		
399	23	I _v	eP F	6	25	36 28					
400	25	I _v	eP F	15	48	09 50					
401	26	I _v	eP F	8	34	24 37					
402	27	I _v	eP F	22	43	08 45					
403	27	I _v	eP F	23	03	24 05					
404	28	I	e F	21	35	53					
405	29	I _u	e S? L?	23	09	27 22 58 -- --					Guatemala? L and ma- xima lost by the changing of paper.
	30		F	1	03						
406	30	I _v	eP F	2	19	00 22					