

SEISMOLOGICAL BULLETIN 1918.

BATAVIA OBSERVATORY, JAVA.

PREFACE

The astatic Seismograph of WIECHERT of 1000 K.G. has been registering regularly since December 6th 1908. The results are published from the beginning of 1909 (the Messina earthquake included) in a monthly bulletin.

The instrument is mounted on a heavy brick pillar in a room with thick walls (about 70 centimeters) which is protected against the sun's heat by open galleries around it. The components are placed in E.-W. and N.-S. direction respectively.

The pins are lifted electrically every hour for a period of 10 seconds by the Javanese observer on duty. A lifting of two seconds every minute is given by an electrical clock of PEYER FAVARGER by means of the second-dial passing every minute through a drop of mercury.

For each month are applied the mean constants for that month. T_0 and ε , the oscillation period and the coefficient of damping, are determined every week. V , the magnification for very short waves, is determined occasionally only. It is found by direct measurement by giving the pendulum a displacement by means of the horizontal adjusting screws, of which the value can be determined easily from the pitch (a) and the angle of displacement of the screws and the height of the screws (b) and of the centre of gravity (c) above the Cardanic suspension apparatus.

It was found:

(a) = 1.407 millimeters.

(b) = 1225 "

(c) = 895 "

The constants used in last year are given below.

1917.	E-W component.			N-S component.		
	V.	T_0 .	ε .	V.	T_0 .	ε .
January	218	7.0	4.5	195	7.2	5.0
February	"	"	5.2	"	"	5.4
March.	"	7.1	5.7	"	7.0	"
April.	"	7.4	6.2	"	"	5.2
May.	"	"	5.0	"	"	5.6
June.	"	"	5.4	"	"	5.2
July.	"	"	5.2	"	7.1	5.1
August	"	"	6.0	"	7.4	5.9
September	"	6.9	"	"	6.8	"
October.	"	6.6	4.7	"	6.6	5.5
November	"	6.7	4.4	"	"	5.4
December.	"	6.8	4.7	"	"	"

The notation employed is that of the Göttingen Geophysical Institute.
The following abbreviations are employed:

CHARACTER OF THE EARTHQUAKE.

- I = perceptible; II = moderately strong; III = strong.
d (terrae motus domesticus) = local.
v (" " vicinus) = near (less than 1000 K.M.).
r (" " remotus) = distant (1000 to 5000 K.M.).
u (" " ultimus) = very distant (over 5000 K.M.).

PHASES.

- P (undae primae) = 1st preliminary tremors.
S (" secundae) = 2nd " "
L (" longae) = principal phase, long waves.
M (" maximae) = maximum amplitude.
C (coda) = prominent waves among the after tremors.
F (finis) = end of perceptible movement.
PR₁, PR₂, SR₁, SR₂, = 1st, 2nd reflected waves of P and S.
PS = waves changed by reflection from longitudinal to transversal oscillation.

WAVE-ELEMENTS, UNITS.

- T = complete period in seconds.
A = amplitude, measured from median position in microns.
A_E = E.-W. component of A.
A_N = N.-S. " " "
i (impetus) = abrupt commencement, clearly defined.
e (emersio) = gradual " , not clearly defined.

SEISMOLOGICAL BULLETIN.
JANUARY 1918.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.
Mean Greenwich time. S. Latitude 6° 11' 0". Height above sealevel 8 m.
E. Longitude 7^h 7^m 19^s.
WIECHERT Horizontal Pendulum, 1000 kilograms.
The symbols are according to WIECHERT.

No.	Date 1918.		Cha- racter.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epi- centrum.	Amplitude (half)		Remarks.
										A _E	A _N	
1	2	Jan.	I,	P S M F	h 18 18 18	m 49 50 51	s 40 5 	6.0	220	μ 12.1	μ 8.1	Malabar: iP = 18 49 23 iS = 28 49 23 △ = 95 K.M.
2	2	"	I	e F	19 19	24 28						
3	4	"	I	e F	15 16	57 26						
4	9	"	I,	P S M F	11 11 11 11	15 15 17 27	21 57 	7.0	320?	13.0	19.6	P a little uncertain.
5	12	"	I	e F	18 19	52 17	24					
6	15	"	I,	iP iS=M F	5 5 5	3 3 11	51 47 	2.0	140	54.9	66.7	Malabar: P—S = 4 sec. △ = 43 K.M.
7	16	"	I	e M F	2 2 2	55 59 59	9	5.5		27.8	17.4	Felt on Soembawa, Soem- ba and Lombok.
8	18	"	I	P M F	11 12 12	58 45 5	59	4.0		25.1	23.1	
9	21	"	I	e M F	19 19 20	51 57 12	17	4.5		28.2	28.4	
10	22	"	I	e F	1 1	55 57						
11	28	"	I	e F	14 14	48 57						
12	28	"	I	e F	22 22	52 41						

No.	Date 1918.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epi- centrum.	Amplitude (half)		Remarks.
										A _E	A _N	
13	30	Jan.	II.	iP iS M F	h 20 20 20 21	m 45 45 47 12	s 4 42	4.9	340	211.—	236.—	Direction E S E - W N W.
14	30	"	I	iP M F	21 21 22	27 35 22	56	5.6		101.—	189.—	Felt at Telok-Betong and Way Lima, Sumatra.
15	31	"	I _v	P S M F	4 4 4 4	26 26 27 30	3 11	2.0	70	38.8	25.8	Felt at Naringgoel, Tjian- ten and Buitenzorg res. Batavia.

SEISMOLOGICAL BULLETIN.

FEBRUARY 1918.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.

Mean Greenwich time. S. Latitude $6^{\circ} 11' 0''$. Height above sealevel 8 m.

E. Longitude $7^{\text{h}} 7^{\text{m}} 19^{\text{s}}$.

WIECHERT Horizontal Pendulum, 1000 kilograms.

The symbols are according to WIECHERT.

No.	Date 1918.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epi- centrum.	Amplitude (half)		Remarks.
										A _E	A _N	
16	2	Febr.	I _v	P S=M F	h m s 20 20 19 20 20 37 20 24			2.0	160?	8.7	15.1	Very small, therefore P uncertain. Malabar: P—S = 5 sec. Δ = 50
17	3	"	I _v	P S M F	11 12 52 11 13 19 11 15 11 20			2.9	240	8.6	11.7	Malabar: P—S = 14 sec. Δ = 135
18	4	"	I	e F	18 18 18 28							Some small long waves.
19	5	"	I	e M F	3 34 53 3 36 3 42			5.0		7.6	6.5	
20	7	"	II _r	iP S M F	5 25 28 5 28 48 5 29 48 6 17			5.5	1970	259.—	249.—	
21	8	"	I _v	iP iS M F	0 40 16 0 40 34 0 40 48 0 47			2.0	160	23.5	15.1	Malabar: P—S = 23.5 sec. Δ = 225 Felt at Pitjoeng-Poeger, Preanger and at Tjema- ra, Bantam.
22	8	"	I _v	iP iS=M F	15 14 51 15 15 8 15 24			2.2	155	73.0	24.6	Malabar: iP—iS = 21 sec. Δ = 190
23	9	"	I	e F	21 1 21 10							
24	12	"	I	e M F	3 3 25 3 8 3 27			5.0		56.6	54.9	Felt at Tandjoeng Poera, Sumatra's Oostkust and in Tapanoeli.
25	12	"	I	e M F	11 44 11 51 12 0			6.0		5.6	5.4	

No.	Date 1918.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epi- centrum.	Amplitude (half)		Remarks.
										A _E	A _N	
					h	m	s			μ	μ	
26	13	Febr.	III _v	iP	2	52	45		410			At 2 ^h 35 ^m 50 ^s pens thrown off. Record restored at 5 ^h 56 ^m . Malabar: iP - S = 34 sec. Δ = 310
				iS	2	53	28					
				M	2	53	49	6.0		334.—	384.—	
27	13	•	II	P	6	13	36		6.4			53 4 97.7
				M	6	25						
				F	7	27						
28	13	•	I	e	22	1			6.0			24.9 17.2
				M	22	7						
				F	22	27						
29	19	•	I	e	16	27						
				F	17	12						
30	21	•	I _v	P	4	14	24		175			Small. Malabar: iP - iS = 10 sec. Δ = 90
				S	4	14	44					
				M	4	16						
				F	4	20						
31	24	•	I	eP	15	34			5.0			32.6 23.3
				M	15	36						
				F	15	47						
32	27	•	I	i	9	56	52		6.0			20.1 23.5
				M	10	2						
				F	10	15						
33	27	•	I	e	15	21						
				F	15	30						

SEISMOLOGICAL BULLETIN.

MARCH 1918.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.

Mean Greenwich time. S. Latitude $6^{\circ} 11' 0''$. Height above sealevel 8 m.

E. Longitude $7^{\text{h}} 7^{\text{m}} 19^{\text{s}}$.

WIECHERT Horizontal Pendulum, 1000 kilograms.

The symbols are according to WIECHERT.

No.	Date 1918.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epi- centrum.	Amplitude (half)		Remarks.
										A _E	A _N	
34	3	March	I _v	P S M F	h m s 14 15 46 14 16 11 14 17 14 29			5.8	260	33.2	28.9	Malabar: iP — iS = 15 sec. $\Delta = 130$ Felt at Cheribon.
35	10	"	I	e F	14 28 14 42							
36	14	"	III _v	iP iS M F	9 21 59 9 22 28 9 23 59 9 47			5.0	260	329.—	388.—	Direction N-S. E-W pen thrown off at 9 ^h 23 ^m . Malabar: iP — iS = 20 sec. $\Delta = 180$ Direction S W — N E. Felt at several places in Batavia and Preanger.
37	16	"	I	e F	13 55 14 30							
38	17	"	I	e F	17 25 17 43							Felt at Tandjoeng Redeb and Tarakan, Borneo.
39	19	"	I	e F	6 5 6 19							
40	22	"	I	e F	7 53 9 8 1							
41	22	"	I	P M F	14 41 25 14 43 14 51			4.8		9.3	11.3	
42	24	"	I	P F	5 19 12 5 27							
43	24	"	II _v	P S? M F	21 59 27 22 0 14 22 2 22 24			5.2		107.4	84.6	Malabar: iP — iS = 30 sec. $\Delta = 275$
44	26	"	I _v	eP S M F	8 15 53 8 14 40 8 16 8 31			6.0	430	18.1	17.8	Malabar: iP — iS = 30 sec. $\Delta = 275$

No.	Date 1918.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epicentrum.	Amplitude (half)		Remarks.
										A _E	A _N	
45	27	March	I	eP	h	m	s		560?	μ	μ	P uncertain.
				S	12	15	11					
				M	12	15	31					
				F	12	19		6.0		18.9	11.9	
					12	25						
46	31	"	I	e	10	7						
				F	10	10						

No.	Date 1918.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epicentrum.	Amplitude (half)		Remarks.
										A _E	A _N	
34	3	March	I	P	14	15	10		260			Malabar: P-12=18 sec. Δ = 150
				S	14	15	11					
				M	14	17						
				F	14	20						
38	10	"	I	c	14	28						
				P	14	42						
39	14	"	III	IP	8	21	30		280			Direction N-S. E-W pen thrown off at 27 sec.
				IS	8	22	38					
				M	8	23	50					Malabar: P-12=20 sec. Δ = 180
				P	8	47						Direction S-W - N-E. Bell at several places in Batavia and Pronger.
37	18	"	I	c	15	38						
				P	14	50						
38	17	"	I	c	17	38						Bell at Tadjoung Bedob and Tadjoung Bedob.
				P	17	43						
39	19	"	I	c	8	8						
				P	8	18						
40	22	"	I	c	7	37	0					
				P	8	1						
41	22	"	I	P	14	47	32		48			
				M	14	47						
				P	14	51						
42	24	"	I	c	8	10	12					
				P	8	27						
43	24	"	II	P	21	39	37					Malabar: P-12=20 sec. Δ = 270
				IS	21	40	14					
				M	22	22						
				P	22	22						
44	26	"	I	cP	8	13	33		420			Malabar: P-12=20 sec. Δ = 270
				S	8	14	40					
				M	8	10						
				P	8	31						

SEISMOLOGICAL BULLETIN.

APRIL 1918.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.
Mean Greenwich time. S. Latitude $6^{\circ} 11' 0''$. Height above sealevel 8 m.
E. Longitude $7^{\text{h}} 7^{\text{m}} 19^{\text{s}}$.

WIECHERT Horizontal Pendulum, 1000 kilograms.
The symbols are according to WIECHERT.

No.	Date 1918.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Distance. of epi- centrum.	Amplitude (half)		Remarks.
										A _E	A _N	
47	1	April	I _v	P	h	m	s		200	μ	μ	Very small.
				S	22	56	28					
				M	22	56	50					
				F	22	58						
48	3	"	I _v	iP	15	8	55	5.0	150?	55.7	48.8	Malabar: eP — S = 16 sec. Δ = 140
				S?	15	8	52					
				M	15	11						
				F	15	25						
49	6	"	I	e	4	28						Felt at Pakoean Ratoe, Su- matra.
				M	4	54						
				F	4	45						
50	10	"	II	P	2	12	27	6.0		172.9	175.5	
				i	2	19	17					
				M	2	19	50					
				F	2	46						
51	12	"	I _v	iP	9	40	54	4.8	160	39.4	45.6	Malabar: iP — iS = 24 sec. Δ = 220
				iS	9	41	12					
				M	9	42	1					
				F	9	49						
52	15	"	I	iP	0	56	6	6.4		27.4	36.6	
				M	1	7						
				F	1	55						
53	15	"	II _v	P	1	59	12	5.8	190	145.8	185.5	Malabar: iP — iS = 12 sec. Δ = 110
				S	1	59	55					
				M	2	2						
				F	2	22						
54	15	"	I	e	11	55						
				F	11	45						
55	25	"	I	P	15	50	57	6.0		12.0	16.4	
				M	15	58						
				F	16	0						
56	25	"	II _v	iP	18	45	14	5.6	200	531.0	192.7	Direction N-S. Malabar: iP — S = 8 sec. Δ = 65 S a little uncertain by mi- nute mark.
				iS	18	45	57					
				M	18	47						
				F	18	59						

No.	Date 1918.	Character.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epicentrum.	Amplitude (half)		Remarks.
				h	m	s			A _E	A _N	
57	25	April	I	e	22	50	3.5		15.5	20.5	
				M	22	55					
				F	23	10					
58	29	"	I	P	9	22	14				
				S	9	22	58				
				M	9	24	1	5.8	5.7	9.0	
				F	9	28					

No.	Date 1918.	Character.	Phase.	Time (Greenwich)	Period in seconds.	Distance of epicentrum.	Amplitude (half)	Remarks.
47	April	I	P	22 50	3.5		15.5	20.5
48	"	I	TP	18 38				
49	"	I	M	18 11				
50	"	II	P	12 37				
51	"	I	TP	18 38				
52	"	II	P	12 37				
53	"	I	TP	18 38				
54	"	I	P	11 48				
55	"	II	TP	18 38				
56	"	II	TP	18 38				

SEISMOLOGICAL BULLETIN.

MAY 1918.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.

Mean Greenwich time. S. Latitude $6^{\circ} 11' 0''$. Height above sealevel 8 m.

E. Longitude $7^{\text{h}} 7^{\text{m}} 19^{\text{s}}$.

WIECHERT Horizontal Pendulum, 1000 kilograms.

The symbols are according to WIECHERT.

N ^o .	Date 1918.		Cha- racter.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epi- centrum.	Amplitude (half)		Remarks.
										A _E	A _N	
					h	m	s			μ	μ	
59	4	May	I	e	6	12		5.5		5.7	6.6	
				M	6	20						
				F	6	48						
60	6	"	I	e	8	49		6.0	195	193.5	203.—	Malabar: P — S = 40 sec. $\Delta = 360$
				F	8	59						
61	8	"	II.	iP	16	30	51					
				iS	16	51	12					
				M	16	55						
				F	16	47						
No record from May 10, 14 ^h 44 ^m till May 11, 2 ^h 54 ^m .												
62	15	May	I	e	3	49				μ	μ	
				F	3	59						
No record from May 14, 0 ^h 18 ^m till 3 ^h 48 ^m .												
63	19	May	I	e	0	38				μ	μ	
				F	0	49						
64	19	"	I.	iP	15	0	38	4.2	160	18.4	18.3	Malabar: iP — iS = 14 se $\Delta = 135$ Felt at Lebak Parai, B tam.
				iS	13	0	58					
				M	13	5						
				F	13	7						
65	20	"	I	e	14	55	46	6.0		15.8	12.3	
				M	15	4						
				e _L	15	48						
				M _{L1}	16	4						
				M _{L2}	16	52						
				F	16	58						
66	20	"	I	P	18	10	50	6.6		56.2	42.3	
				S	18	12	10					
				M	18	15	15					
				F	18	51						

No.	Date 1918.	Character.	Phase.	Time (Greenwich).	Period in seconds.	Distance of epi- centrum.	Amplitude (half)	
							A _E	A _N

Remarks.


 International
Seismological
Centre

				h	m	s		μ	μ
67	22	May	I	6	42	28			
			i	6	53		6.0	46.4	32.4
			M	7	23				
			F						
68	25	"	I	19	50				
			e	20	19				
			F						
69	26	"	I	19	58	47			
			e	19	40	4	2.6	8.8	10.0
			M	19	44	13			
			F						
70	26	"	I	19	45				
			e	19	52		6.0	9.1	10.0
			M	20	5				
			F						
71	27	"	I	13	50	56			
			e	13	51	28			
			S	13	55		4.5	25.9	17.9
			M	13	40				
			F						

SEISMOLOGICAL BULLETIN

JUNE 1918.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.

Mean Greenwich time. S. Latitude $6^{\circ} 11' 0''$. Height above sealevel 8 m.

E. Longitude $7^{\text{h}} 7^{\text{m}} 19^{\text{s}}$.

WIECHERT Horizontal Pendulum, 1000 kilograms.

The symbols are according to WIECHERT.

No.	Date 1918.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epicentrum.	Amplitude (half)		Remarks.
										A _E	A _N	
72	3	June	I	e	h	m	s			μ	μ	
				F	1	9						
					1	23						
73	4	"	I	e	4	11		6.0		6.1	6.7	
				M	4	21						
				F	4	40						
74	4	"	I	e	17	23						
				F	18	18						
75	6	"	I	e	18	23						
				F	18	43						
76	8	"	I	P	20	18	42		2520?			
				S?	20	22	49					
				M	20	24		6.4		24.9	26.1	
				F	20	33						
77	10	"	I	e	15	45						
				M	15	53		5.5		10.5	14.7	
				F	16	8						
78	12	"	I,	P	23	28	47		105			Malabar: i P — i S = 13 sec.
				i S=M	23	28	58					$\Delta = 120$
				F	23	33						
79	13	"	I,	P	16	34	6		230			
				S	16	34	51					
				M	16	37		4.5		10.2	11.2	
				F	18	42						
80	16	"	I	e	5	20						
				M	5	29		6.2		10.9	8.2	
				F	5	48						
81	16	"	I,	i P	15	49	41		355			Direction E-W.
				S	15	50	18					Malabar: i P — i S = 33 sec.
				M	15	52		5.3		75.3	65.6	$\Delta = 300$
				F	16	2						
82	21	"	I	e	15	33						
				M	15	39		4.5		19.7	17.0	
				F	15	48						
83	26	"	I	e	5	10						
				F	5	20						
84	29	"	I	e	4	31						
				M	4	35		6.4		63.9	91.	
				F	5	8						

No.	Date 1918.		Char-acter.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epi-centrum.	Amplitude (half)		Remarks.
										A _E	A _N	
85	30	June	I	iP iS M F	h m s 4 2 8 4 2 36 4 4 18	2 8 1 2 36 4 4 18	5.2	240	64.0	82.6		
86	30	.	I	eP S M F	5 5 5 5 4	36 37 39 40 48	47 22	5.2		19.6	25.5	

72	2	June										
73	4											
74	4											
75	6											
76	8											
77	10											
78	12											
79	13											
80	16											
81	16											
82	21											
83	26											
84	29											

 International
Seismological

From the ISC collection

SEISMOLOGICAL BULLETIN.

JULY 1918.

BATAVIA OBSERVATORY, JAVA.

Foundation: River, Quartair.

Mean Greenwich time. S. Latitude $6^{\circ} 11' 0''$. Height above sealevel 8 m.

E. Longitude $7^{\text{h}} 7^{\text{m}} 19^{\text{s}}$.

WIECHERT Horizontal Pendulum, 1000 kilograms.

The symbols are according to WIECHERT.

No.	Date 1918.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epi- centrum.	Amplitude (half)		Remarks.
										A _E	A _N	
87	1	July	II,	P	h	m	s	6.2	2810	μ	μ	
				S	6	3	51					
				M	6	8	20			77.9	99.3	
				F	7	11						
88	2	"	I,	e	3	41		3.8		5.7	7.0	
				M	3	44						
				F	3	53						
89	3	"	II,	iP	6	59	11	6.5	890	139.6	165.7	Direction E-W
				iS	7	0	48					
				M	7	10						
				F	9	8						
90	8	"	III	P	10	28	54	6.0		325.0	267.3	
				M	10	38						
				F	12	8						
91	9	"	I	e	2	1		6.0		7.4	18.1	
				M	2	6						
				F	2	16						
92	9	"	I	e	3	10						
				F	3	20						
93	16	"	I,	P	2	13	41	4.0	150	14.5	24.0	Malabar: iP — iS = 13 sec. $\Delta = 120$ Felt at Pitjoeng-Poeger, Preanger.
				S	2	13	58					
				M	2	18						
				F	2	23						
94	16	"	I	e	20	26						
				F	20	34						
95	20	"	I,	iP	11	5	14	3.6	290	86.8	124.9	Malabar: P — S = 25 sec. $\Delta = 300$ Felt at Pitjoeng-Poeger, Preanger.
				iS	11	5	46					
				M	11	7						
				F	11	23						
96	21	"	I	e	6	18		6.0		14.1	20.3	
				M	6	38						
				F	7	18						
97	21	"	I	e	9	53						
				F	10	10						
98	24	"	I,	iP	5	8	2	3.6	190	116.4	114.2	Direction ESE-NNW.
				iS	5	8	22					
				M	5	10						
				F	5	25						



No.	Date 1918.	Character.	Phase.	Time (Greenwich).	Period in seconds.	Distance of epi- centrum.	Amplitude (half)		Remarks.
							A _E	A _N	
99	29	July	I	h m s 11 26 11 41			μ	μ	
100	29	.	I	e 16 57 M 17 7 F 17 35	6.0		29.7	30.9	

SEISMOLOGICAL BULLETIN.

AUGUSTUS 1918.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.

Mean Greenwich time. S. Latitude $6^{\circ} 11' 0''$. Height above sealevel 8 m.

E. Longitude $7^{\circ} 7' 19''$.

WIECHERT Horizontal Pendulum. 1000 kilograms.

The symbols are according to WIECHERT.

No.	Date 1918.		Character.	Phase	Time (Greenwich)			Period in seconds.	Distance of epi- centrum.	Amplitude (half)		Remarks.
										A _E	A _N	
					h	m	s			μ	μ	
101	1	Aug.	I	e F	6	1						
102	3	"	I	e F	1	49						
103	8	"	I	e M F	9	57		6.0		12.8	16.5	
104	11	"	I	e	25	53						
	12	"		F	0	8						
105	12	"	II _a	iP iS M F	4	58	49	5.0	240	336.	362.--	Malabar i P — S = 37 sec. Δ 350 Felt at Batavia, Bantam and S-E Sumatra
106	15	"	III _r	P S M	12	22	53	5.5	1020	>389.	>383.--	At 12 ^h 26 ^m the E-W boom gets out of order. End masked by No. 107. Felt in res. of Menado, N. Celebes.
107	15	"	II _r	iP iS M eL ML ₁ ML ₂	15	5	29	6.0	2440	?	314.5	
					15	9	29					
					15	9	49					
					15	15		12.0		?	73.6	End masked by No. 108
					15	21		24.0				
					15	12						
108	15	"	I	eP M F	15	31		6.3		?	54.6	
					15	35						
					16	16						
109	15	"	II _r	iP S M F	17	55	7	6.3	2440	?	383.--	
					17	59	7					
					17	42						
					18	21						
110	15	"	I	e M F	18	26		5.0		?	5.1	
					18	55						
					18	46						
111	15	"	I	e F	20	11						
					20	27						

No.	Date 1918.		Character	Phase.	Time (Greenwich).			Period in seconds.	Distance of epi- centrum.	Amplitude (half)		Remarks.
										A _E	A _N	
112	15	Aug.	I	e	h	m	s					
				M	20	37						
				F	20	45		5.8		?	10.6	
					20	58						
115	16	"	I	eP	3	50	25					E-W boom restored at
				M	3	37		6.4		70.8	67.2	1 ^h 30 ^m
				F	4	10						
114	16	"	I	e	4	51						
				F	5	5						
113	16	"	I	e	7	26						
				M	7	52		6.0		19.1	11.6	
				F	8	1						
116	16	"	I	P	8	40	35					
				M	8	45		5.1		21.9	25.5	
				F	9	25						
117	16	"	I	i	9	50						
				M	9	55		5.1		19.4	14.9	
				F	10	16						
118	16	"	I	i	10	41	1					
				M	10	46		6.5		21.4	26.8	
				F	11	26						
119	16	"	I	e	16	58						
				M	17	5		6.0		13.6	19.6	
				F	17	28						
120	18	"	I	e	5	55						
				M	4	5		6.0		8.4	7.6	
				F	4	11						
121	18	"	I	e	6	9						
				M	6	15		6.0		24.6	29.5	
				F	6	45						
122	19	"	I	e	17	32						
				M	17	59		5.0		32.5	29.8	
				F	17	51						
123	20	"	I	e	0	5						
				M	0	8		5.8		18.8	14.1	
				F	0	25						
124	20	"	I	e	13	1						
				F	13	12						
125	21	"	I	e	0	25						
				F	0	56						
126	21	"	I,	iP	20	51	24		175			Malabar: iP - iS = 17 sec.
				iS	20	51	44					$\Delta = 150$
				M	20	51	51	4.0	94.8	102.9		Direction SW - NE.
				F	21	5						Felt in Bantam and Preanger.

No.	Date 1918.		Character	Phase.	Time (Greenwich).			Period in seconds.	Distance of epi- centrum.	Amplitude (half)		Remarks.
										A _E	A _N	
127	25	Aug.	I	e	h	m	s					
				M	7	46	30					
				F	7	51		6.0		14.5	16.5	
					7	48						
128	25	"	I	e	0	55						
				M	0	58		5.5		13.6	12.5	
				F	1	8						
129	27	"	I	e	20	7						
				F	20	14						
130	31	"	I	e	1	46						
				F	1	56						
131	31	"	II,	iP	21	54	58		590			Direction SE - NW.
				iS	21	56	5					Felt in Soerakarta, Banjoemas, Kedoe, Madioen, Paseroean.
				M	21	57	58	5.0		355.6	319.2	Malabar iP - iS = 37.5 sec.
				F	22	29						$\Delta = 340$

SEISMOLOGICAL BULLETIN.

SEPTEMBER 1918.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartaire.

Mean Greenwich time. S. Latitude $6^{\circ} 11' 0''$. Height above sealevel 8 m.

E. Longitude $7^{\text{h}} 7^{\text{m}} 19^{\text{s}}$.

WIECHERT Horizontal Pendulum, 1000 kilograms.

The symbols are according to WIECHERT.

No.	Date 1918.	Character.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epi- centrum.	Amplitude (half)		Remarks.
									A _E	A _N	
				h	m	s			μ	μ	
132	1	Sept.	I	e	20	6					
			F		20	16					
133	2	"	I _v	P	14	22	41	820			
			S		14	23	9				
			M		14	30		6.0	6.2	5.8	
			F		14	58					
134	3	"	I	e	15	12					
			F		15	25					
135	4	"	I _v	P	5	13	6	540			Malabar: i P — i S = 29 sec.
			S		5	14	6				$\Delta = 280$
			M		5	15	5.5		95.2	106.4	Felt in res. Banjoemas
			F		5	34					Centr. Java.
136	4	"	I	e	17	22					
			F		17	36					
137	5	"	I	eP	7	10	28				
			M		7	15	6.2		60.6	85.8	
			F		7	43					
138	7	"	I	e	7	19					
			M		7	24	5.8				
			F		7	32					
139	7	"	H _u	P	17	27	0	6370			
			PR ₁		17	29	48				
			PR ₂		17	31	26				
			S		17	34	56				
			M		17	38	5.4		92.5	114.6	
			eL		17	43					
			ML ₁		17	58	23.6		582.0	422.6	
			ML ₂		18	22	16.0		535.5	286.4	
			ML ₃		21	1	18.0		25.1	21.4	
			ML ₄		21	28	16.0		9.0	15.8	
			F		21	48					
140	8	"	I	e	22	51	46				
			M		22	56	5.9		20.3	54.0	
			F		23	3					

No.	Date 1918.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epicentrum.	Amplitude (half)		Remarks.
										A _E	A _N	
141	9	Sept.	I	e	h	m	s			μ	μ	
				M	14	26				7.3	7.1	
				F	14	31		6.0				
					14	41						
142	11	"	II _r	iP	4	11	19		2555			Direction SW-NE.
				iS	4	15	25			72.1	172.0	
				M	4	16		5.8				
				F	4	48						
143	15	"	I	e	7	1						
				F	7	18						
144	15	"	I	e	7	56						
				F	8	15						
145	14	"	I	e	17	5				6.2	10.7	
				M	17	26		6.0				
				F	17	36						
146	17	"	I _v	P	19	29	1		140			Malabar: iP—iS=11 sec.
				S	19	29	27					$\Delta = 100$
				M	19	50						Felt at Pitjoeng-Poeger,
				F	19	55						Preanger, Java.
147	19	"	I	P	2	16	55			71.0	56.2	Malabar: P—S = 51 sec.
				M	2	19		5.0				$\Delta = 280$.
				F	2	53						Direction NW-SE.
												Felt in East Java, Madoe-
												ra and Bali.
148	19	"	I _v	P	19	55	26		440			Malabar: P—S = 51 sec.
				S	19	54	15					$\Delta = 280$
				M	19	56		5.1		108.4	81.5	
				F	20	22						
149	21	"	I _v	P	15	52	55			15.2	15.7	Felt at Palembang and
				M	15	56		4.0				Benkoelen, S. Sumatra.
				F	15	42						
150	22	"	II _v	iP	9	57	7		1280			Direction SW-NE.
				S?	9	59	25			272.7	223.1	Felt at Padang, Sumatra;
				M	10	1		6.0				small destructions.
				F	10	55						
151	29	"	I	e	12	19				11.5	17.0	
				M	12	32		6.0				
				eL	12	53						
				ML	12	58		16.0				
				F	15	16						
152	30	"	I _v	iP	9	24	52		180			Malabar: iP—iS=18 sec.
				iS	9	25	12					$\Delta = 160$
				M	9	25	20	5.6		62.8	54.4	Felt at Tjanten, res. Ba-
				F	9	55						tavia.
155	30	"	I	e	15	57						
				F	14	4						

No.	Date 1918.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epicentrum.	Amplitude (half)		Remarks.
										A _E	A _N	
154	30	Sept	I _v	P	h	m	s		340	μ	μ	
				S	14	7	55					
				M	14	8	54	4.0		13.5	15.5	
				F	14	10						
					14	21						
155	30	"	I _v	P	18	2	17		7080?			
				S?	18	10	50					
				M	18	12		6.0		20.6	21.0	
				eL	18	26						
				ML	18	28		18.0		44.0	49.9	
156	30	"	I _v	e	18	46	10		6560?			
				S?	18	54	16					
				F	19	18						

SEISMOLOGICAL BULLETIN.

OCTOBER 1918.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quarltair.

Mean Greenwich time. S. Latitude $6^{\circ} 11' 0''$. Height above sealevel 8 m.

E. Longitude $7^{\circ} 7' 19''$.

WIECHERT Horizontal Pendulum, 1000 kilograms.

The symbols are according to WIECHERT.

No.	Date 1918.	Character.	Phase.	Time (Greenwich).	Period in seconds.	Distance of epi- centrum.	Amplitude (half)		Remarks.
							A _E	A _N	
				h m s			μ	μ	
157	1	Oct.	I _v	P S M F	0 58 56 0 39 9 1 1 1 13	165	47.3	48.5	
158	1	"	I _v	P S M F	12 54 10 12 54 28 12 56 15 6	165	39.2	34.5	
159	2	"	I	e M F	0 25 0 55 0 48	5.4	14.8	13.2	
160	2	"	I	e M F	15 28 15 55 15 48	5.9	7.3	7.4	
161	5	"	I _v	P S M F	10 25 51 10 26 19 10 28 10 40	250	16.9	19.6	
162	9	"	II _r	iP S? M F	9 20 50 9 23 19 9 24 9 55	1470?	151.2	147.3	Malabar iP—iS=126 sec. Δ = 1180. Felt on E-Java, Bali, Lom- bok, Flores, Soemba.
163	11	"	I _u	e M eL ML ₁ ML ₂ F	14 54 58 14 47 15 16 15 52 15 48 16 28	12000?	14.7	19.9	
164	15	"	I	e F	12 50 13 8				
165	14	"	I _u	e M eL ML F	12 12 12 22 12 40 12 43 12 58	8000?	23.9	14.2	

No.	Date 1918.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epicentrum.	Amplitude (half)		Remarks.
										A _E	A _N	
166	14	Oct.	I _v	P S M F	h 19 19 19 19	m 41 41 42 45	s 16 33 		150	μ	μ	Malabar: iP—iS=11 sec. Δ = 9%
167	15	"	I _v	eP S M F	1 1 1 1	28 28 30 39	16 44 30 59		230	14.8	10.5	Malabar: iP—iS=12 sec. Δ = 110
168	16	"	I	P M F	19 19 20	33 39 18		5.5		61.8	36.2	Malabar iP—iS=177 sec. Δ = 1710
169	22	"	I _v	P S M F	8 8 8 8	12 16 18 35	40 43 		2470			Felt at Wal Werang, Solor-Isles. Felt at Tobelo, Halmaheira.
170	25	"	I _v	eP S M F	19 19 19 19	8 12 15 38	32 27 		2580			
171	26	"	I	e M F	17 17 17	5 8 18		6.0		9.2	10.6	
172	27	"	I _u	eP S M eL F	15 15 15 15 16	56 44 45 56 25	41 11 		5890			
173	27	"	I	P M F	17 17 18	14 24 48	57 	6.0		58.7	77.6	

SEISMOLOGICAL BULLETIN.

NOVEMBER 1918.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quattair.

Mean Greenwich time. S. Latitude $6^{\circ} 11' 0''$. Height above sealevel 8 m.

E. Longitude $7^{\text{h}} 7^{\text{m}} 19''$.

WIECHERT Horizontal Pendulum, 1000 kilograms.

The symbols are according to WIECHERT.

No.	Date 1918.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epicentrum.	Amplitude (half)		Remarks.
										A _E	A _N	
174	2	Nov.	I _v	eP S=M F	h m s 0 23 26 0 23 41 0 26				135?			Very small record, hence P uncertain.
175	3	"	I _n	P S? M eL ML F	11 24 31 11 33 7 11 35 11 48 11 51 12 13		5.7 14.0		7200?	7.1 19.7	10.3 16.3	
176	3	"	I	e F	12 51 15 5							Felt at Banggai-Archipelago, Celebes, and Ceram.
177	5	"	I _v	P iS=M	16 26 29 16 26 49		2.0		160	26.3	17.3	
178	6	"	I	e M F	22 9 23 22 14 22 22		6.5			4.2	7.5	
179	8	"	II _n	P S M eL ML F	4 48 44 4 57 36 4 59 5 7 5 28 6 46		5.8 17.0		7450	68.5 114.0	122.9 110.4	Malabar very small record.
180	8	"	I	e M F	5 12 24 5 19 5 22		5.0			27.9	15.1	Covered by No. 179.
181	8	"	I _v	iP iS M F	7 37 45 7 38 5 7 40 49 7 50		4.4		180	85.2	105.1	Malabar: iP - iS = 13.6 sec. $\Delta = 140$ Felt at Lebak Parai, Bantam.
182	18	"	III _v	iP iS M ML F	18 46 40 18 50 39 18 52 19 28 21 10		6.0 18.0		2440	>369.6 138.7	>374.9 149.7	Animuth E 13° S. Malabar: iP - S = 215 sec. $\Delta = 2100$ Felt at Timor, Neira, Aroe-Isles and Merauke.

No.	Date 1918.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epi- centrum.	Amplitude (half)		Remarks.
										A _E	A _N	
185	19	Nov.	I _v	iP iS M F	h 1 1 1 1	m 2 2 3 9	s 5 22 2 9	2.0	130	12.1	14.6	Malabar iP — S = 14.3 sec. Δ = 125
184	19	"	I _v	P S M F	4 4 4 4	5 5 6 11	15 51 28	4.8	160	5.3	8.4	Malabar very small.
183	19	"	I	e M F	5 5 5	27 31 47		5.6		8.8	12.9	Malabar small.
186	19	"	I _v	eP S M F	20 20 20 20	42 42 43 51	5 57	4.0	490	8.2	10.5	Malabar small.
187	21	"	I	e M F	1 1 1	39 45 56		5.8		7.9	9.2	
188	22	"	I _v	P S? M F	22 22 22 22	21 25 27 40	45 34 5	4.8	2300?	8.1	12.2	Malabar very small. Felt at Ternate.
189	23	"	I	e M F	0 0 1	39 44 5		6.5		5.0	5.6	
190	23	"	II	iP M F	25 25 0	5 9 10	41	5.9		107.3	108.1	Animuth E 11° 20' S. Malabar iP — iS = 226 sec. Δ = 2270
191	24	"	I	e M F	17 17 17	28 34 42		5.8		5.0	4.4	Felt at Neira, Ceram, Aroe- Isles and Merauke.
192	27	"	I	e F	19 20	39 6						
193	28	"	I	e F	2 2	24 34						
194	28	"	I	e M F	5 5 5	33 44 48		6.0		5.4	4.9	
195	28	"	I _v	eP S? M F	20 20 20 20	17 18 21 42	34 45	4.4	630?	13.1	14.9	Malabar very small.
196	30	"	I	e F	7 7	52 48						
197	30	"	I	e F	11 11	40 51						

SEISMOLOGICAL BULLETIN.

DECEMBER 1918.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.

Mean Greenwich time. S. Latitude $6^{\circ} 11' 0''$. Height above sealevel 8 m.

E. Longitude $7^{\text{h}} 7^{\text{m}} 19^{\text{s}}$.

WIECHERT Horizontal Pendulum, 1000 kilograms.

The symbols are according to WIECHERT.

No.	Date 1918.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Distance of epi- centrum.	Amplitude (half)		Remarks.
										A _E	A _N	
					h	m	s			μ	μ	
198	1	Dec.	I	e	2	44		6.4				
				M	2	57				9.4	7.9	
				F	3	54						
199	2	"	I	e	10	7	47	4.1				
				M	10	9				9.5	8.2	
				eL	11	5						
				ML ₁	11	5		22.8		66.8	29.2	
				ML ₂	11	10		20.0		57.9	44.4	
				ML ₃	11	17		18.2		48.9	25.9	
				F	11	55						
200	3	"	I	e	17	52		5.6				
				M	17	56				5.5	7.2	
				F	18	21						
201	4	"	II _v	eP	12	7	46	6.1	600?			Malabar eP — iS? = 29 sec.
				iS?	12	8	51					$\Delta = 260$
				M	12	8				66.5	77.2	
				F								Covered by No. 202.
202	4	"	I	eL	12	56		26.0				Beginning covered by No.
				ML ₁	12	55				191.5	75.9	201.
				ML ₂	13	8				102.1	526.8	Malabar eL = 13 ^h 10 ^m .
				ML ₃	13	57				68.7	44.2	End covered by 203.
				F	14	14						
203	4	"	I	e	14	12		6.4				Beginning covered by 202.
				M	14	17				5.6	5.7	
				F	14	55						
204	4	"	II _v	eP	21	5	5	5.9	580			Malabar eP — iS = 37 sec.
				iS	21	5	45					$\Delta = 330$
				M	21	6				193.2	171.7	
				F	21	22						
205	6	"	I	e	7	42		5.5				
				M	7	44				2.8	5.1	
				F	7	52						
206	7	"	I _v	eP	23	38	50	150				Malabar e — iS = 12.4
				iS=M	23	39	7					$\Delta = 115$
				F	23	45						

No.	Date 1918.		Character.	Phase.	Time (Greenwich).	Period in seconds.	Distance of epi- centrum.	Amplitude (half)		Remarks.
								A _E	A _N	
07	8	Dec.	I	eP iS=M F	h m s 25 58 48 25 39 7 25 44		170	μ	μ	Malabar eP—iS = 11 sec. Δ = 100 Felt at Pitjoeng-Poeger, Preanger, Java.
08	9	"	I	e M F	19 6 19 18 19 29					
09	11	"	II	iP iS=M F	19 35 18 19 35 45 19 44		250			Malabar eP—S = 27 sec. Δ = 240.
10	14	"	I	e M F	18 49 2 18 59 19 32	5.1		24.0	14.5	
11	16	"	I	e M F	5 12 5 19 5 37	6.6		6.2	5.7	
12	18	"	I	e M F	21 34 21 41 21 55	6.5		8.9	15.1	
13	21	"	I	e F	4 45 4 52					
14	21	"	I	e iS=M F	15 55 50 15 56 14 16 1		210			
15	21	"	I	" iS=M F	17 31 17 31 55 17 35					
16	21	"	I	e F	20 34 20 40					
17	25	"	I	e M F	5 16 52 5 20 48 5 29	5.8		—	5.4	
18	25	"	I	e F	9 57 10 16					
19	24	"	I	e M F	21 40 21 45 21 55					
20	25	"	I	e M F	1 14 47 1 25 20 1 34	5.8		4.5	3.9	
21	25	"	I	P S? M F	10 29 7 10 29 49 10 51 50	5.5	380	22.0	15.9	Malabar P—S = 11 sec. Δ = 100. F Covered by No. 222.

No.	Date 1918.		Character.	Phase.	Time (Greenwich).	Period in seconds.	Distance of epi- centrum.	Amplitude (half)		Remarks.
								A _E	A _N	
222	25	Dec.	I	M F	h m s 10 40 10 57	2.7		μ 29.5	μ 28.5	P covered by No. 221.
223	28	"	I	e M F	8 8 8 15 8 22	6.2		12.5	9.4	
224	30	"	I	e F	7 21 7 52					