

# SEISMOLOGICAL BULLETIN 1913.

## BATAVIA OBSERVATORY, JAVA.

### PREFACE.

The astatic Seismograph of WIECHERT of 1000 K.G. has been registering regularly since December 6<sup>th</sup> 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  $\epsilon$ , 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.

1912.	E.-W. component.			N.-S. component.		
	V.	$T_0$ .	$\epsilon$ .	V.	$T_0$ .	$\epsilon$ .
January . . . . .	214	7.5	5.0	187	9.3	5.6
February . . . . .	"	7.5	5.2	"	9.4	6.0
March. . . . .	"	7.4	4.4	"	9.1	4.5
April. . . . .	"	7.4	4.6	"	9.0	4.1
May. . . . .	"	7.4	4.8	"	9.4	4.6
June. . . . .	"	7.5	4.9	"	9.2	4.6
July. . . . .	"	7.5	4.2	"	9.1	4.5
August. . . . .	"	7.4	4.5	"	9.2	4.3
September . . . . .	"	7.3	4.2	"	9.1	4.7
October. . . . .	"	7.3	4.5	"	9.0	4.8
November . . . . .	"	7.2	4.2	"	9.1	5.1
December. . . . .	"	7.1	4.0	"	8.9	4.9

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) = 1<sup>st</sup> preliminary tremors.

S (undae secundae) = 2<sup>nd</sup> " "

L (undae longae) = principal phase, long waves.

M (undae maximae) = maximum amplitude.

C (coda) = prominent waves among the after tremors.

F (finis) = end of perceptible movement.

PR<sub>1</sub>, PR<sub>2</sub>, . . . . SR<sub>1</sub>, SR<sub>2</sub>, . . . . = 1<sup>st</sup>, 2<sup>nd</sup> . . . . 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<sub>E</sub> = E.-W. component of A.

A<sub>N</sub> = N.-S. " " "

i (impetus) = abrupt commencement, clearly defined.

e (emersio) = gradual " , not clearly defined.

Year	Month	Day	Time	Location	Intensity	Duration	Direction
1912	January	1	10.00	Java	III	10.00	W
	February	1	10.00	Java	III	10.00	W
	March	1	10.00	Java	III	10.00	W
	April	1	10.00	Java	III	10.00	W
	May	1	10.00	Java	III	10.00	W
	June	1	10.00	Java	III	10.00	W
	July	1	10.00	Java	III	10.00	W
	August	1	10.00	Java	III	10.00	W
	September	1	10.00	Java	III	10.00	W
	October	1	10.00	Java	III	10.00	W
	November	1	10.00	Java	III	10.00	W
	December	1	10.00	Java	III	10.00	W

# SEISMOLOGICAL BULLETIN.

## JANUARY 1913.

### 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 1915.		Character.	Phase.	Time (Greenwich).			Amplitude (half)		Remarks.
								A <sub>E</sub> .	A <sub>N</sub> .	
					h	m	s	μ	μ	
1	5	January.	I	e	17	32				
				M <sub>L</sub>	17	56		12	8.4	5.9
				F	18	12				
2	7	"	I	e	22	57	54			
				M	23	0		4.5	7.9	14.5
				F	23	39				
3	7	"	I <sub>v</sub>	P	25	40	21			
				S	23	41	19			
				M	23	42		6	18.1	20.0
				F	23	55				
4	8	"	I <sub>v</sub>	i P	22	42	3			
				i S	22	42	18			
				M	22	45	0	4.5	47.5	52.8
				F	22	51				Felt in Goenoeng Walet Preanger, Java. In Malabar: P-S = 16 seconds.
5	9	"	I	e	3	1	48			
				M	3	16		7	9.4	5.3
				F	4	4				
6	9	"	I	e	4	11				
				M	4	21		6	2.1	2.7
				F	4	52				
7	9	"	I <sub>r</sub>	e P	6	17	22			
				e S	6	23	23			
				M	6	25		5.5	9.9	5.5
				F	6	35				
8	10	"	I	e	7	46				
				M	7	48		5	3.2	3.2
				F	7	59				
9	11	"	III <sub>r</sub>	P	13	20	52			
				S	15	25	58			
				M	15	27		6	> 320	> 380
				e L	15	29				Felt in Posso, Paloe, Go- rontalo, Donggala and Makale, Celebes. In Malabar: P-S = 3 min. 12 sec.
				F	14	45				

N <sup>o</sup> .	Date 1915.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.
									A <sub>E</sub> .	A <sub>N</sub> .	
10	15	January.	I <sub>r</sub>	e P	h	m	s		μ	μ	Felt in Posso, Paloe, Donggala, Makale and Parigi, Celebes.
				e S	15	24	25				
				M	15	29	19	14	18.5	10.4	
				F	15	31					
11	13	"	II <sub>v</sub>	P	19	32	13				Felt in Pagar Alam and Moeara Doea, Palembang, in Manna and Tandjong Sakti, Benkoelen, Sumatra.
				S	19	33	8	4.5	243.0	285.6	
				M	19	34					
				F	20	8					
12	15	"	I	e	2	17	13				
				M	2	23		6	7.1	6.7	
				F	2	32					
13	19	"	II <sub>r</sub>	P	17	10	20				
				S	17	14	15				
				M	17	15		5.5	501.9	390.9	
				e L	17	17	6				
				F	18	19					
14	19	"	I <sub>u</sub>	e P	23	58	56				
				S	0	7	10				
				M	0	8		6	28.4	35.5	
				F	0	32					
15	23	"	I	e	14	9					
				M	14	17		5.5	5.7		6.4
				F	14	32					
16	24	"	I <sub>v</sub>	P	8	25	39				
				S	8	25	55				
				M	8	28		5	33.9	162.4	
				F	8	45					
17	25	"	I <sub>v</sub>	P	14	31	21				In Malabar: P—S = 11 seconds.
				S	14	31	31				
				M	14	33		5	7.2	5.1	
				F	14	37					
18	28	"	I	e	4	34	5				
				M	4	41		5.5	8.2	9.7	
				F	5	1					

# SEISMOLOGICAL BULLETIN.

## FEBRUARY 1913

### 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 <sup>o</sup> .	Date 1915.		Cha- racter.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.
									A <sub>E</sub> .	A <sub>N</sub> .	
					h	m	s		μ	μ	
19	7	February.	I	P	3	10	40	6	26.6	33.8	
				M	3	18					
				F	3	41					
20	8	»	I	e	1	50		3	4.2	2.3	
				M	1	52					
				F	1	56					
21	9	»	I <sub>v</sub>	P	17	51	52	5.5	9.6	12.9	Felt in Tandjong Sakti, Residency of Benkoelen, Sumatra.
				S	17	52	44				
				M	17	54					
				F	17	42					
22	11	»	I <sub>r</sub>	P	25	39	26	6	35.2	48.2	Felt in Donggala, Residen- cy of Menado, Celebes.
				e S	25	42	52				
				M	25	45					
				F	0	12					
23	14	»	I	P	16	52	54	5.5	6.8	5.8	
				M	16	54	14				
				F	16	59					
24	14	»	I	P	19	1	21	5.5	7.5	6.2	
				M	19	4					
				F	19	17					
25	16	»	I	e	15	1					
				F	15	7					
26	17	»	I	e	4	52	14	5.5	5.7	4.0	
				M	4	54					
				F	5	7					
27	20	»	I <sub>u</sub>	P	9	8	58	6	22.4	18.0	Indistinct flat long waves.
				S	9	16	53				
				M	9	19					
				F	9	54					

No.	Date 1913.	Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.
								A <sub>E</sub> .	A <sub>N</sub> .	
				h	m	s		μ	μ	
28	25	February.	I	e	14	28	17			
				M	14	38	5	11.4	7.2	
				F	14	52				
29	26	"	I	e	15	23	11			
				M	15	24	12	7.4	4.9	
				F	15	32				



# SEISMOLOGICAL BULLETIN.

## MARCH 1913.

### 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 1913.	Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.
								A <sub>E</sub> .	A <sub>N</sub> .	
30	1	March.	I	e	14	59				
				F	14	55				
31	3		I	e	20	9				
				M	20	16	6.0	14.9	14.5	
				F	20	32				
32	4		I	P	6	59	14			Felt in Gorontalo and Posso, Celebes.
				S	7	2	57			
				M	7	3	14	65.6	57.9	
				F	7	36				
33	4		I	P	17	7	38			
				S	17	8	22			
				M	17	8	46	6.2	10.9	21.9
				F	17	14				
34	6		I	e	6	55				
				M	6	58	6.0	1.8	2.2	
				F	7	7				
35	6		I	e	11	15				
				M <sub>L</sub>	11	24	5.0	9.6	8.2	
				M <sub>L</sub>	11	34	13	10.5	6.1	
				F	11	54				
36	8		I	P	3	37	6			
				M	3	59	6	75.6	75.9	
				F	3	56				
37	14		III	P	8	50	6			S is not certain, for probably shortly after P a new shock sets in.
				S?	8	50	56			In Malabar:
				M			6	>300	>400	P = 8 <sup>h</sup> 50 <sup>m</sup> 1 <sup>s</sup> .
				M <sub>L</sub>	11	31	25		12.9	S? = 8 <sup>h</sup> 50 <sup>m</sup> 41 <sup>s</sup> .
				F	11	38				Felt in Bolaong, Menado, Gorontalo and Posso, Celebes and on the isle of Saparoea near Ambon. The origin of this earthquake is probably in Sangi island, to the north of Menado.



No.	Date 1915.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.	
									A <sub>E</sub> .	A <sub>N</sub> .		
38	16	March.	I	e	h	m	s	6	μ	μ		
					6	20			5.1	2.6		
					M	6	26					
39	16	.	I <sub>v</sub>	P	8	20	52	6	13.1	7.5	In Malabar: P-S = 9 sec. Felt in Goenoeng Walet, near Tjibadak, Preanger.	
					S	8	21					8
					M	8	22					5
40	17	.	I	e	0	57		5.5	7.0	4.4	East of Leyte, Philippines.	
					M	1	3					
					F	1	17					
41	18	.	I	e	1	17						
					F	1	30					
42	23	.	I <sub>u</sub>	i P	20	52	38	6	80.2	53.1	Time marks are wanting, therefore the absolute times are not correct.	
					i S, M	20	59					5
					F	21	25					
43	24	.	I <sub>v</sub>	P	16	18	58	6	89.5	105.2	Time marks as above. Felt in Manna, Benkoelen, Sumatra.	
					S	16	19					24
					M	16	22					
					F	16	49					
44	26	.	I	e	21	41		5.5	18.5	13.5	Southeast of Luzon, Phi- lippines	
					M	21	45					
					F	22	15					
45	27	.	I	e	9	18						
					M	9	25					
					F	9	39					
46	29	.	I	e P	8	9	47	5.0	5.9	4.1		
					M	8	11					44
					F	8	18					
47	31	.	I	e P	5	54		5.5	11.1	10.7		
					M	5	59					
					F	5	18					



# SEISMOLOGICAL BULLETIN.

## APRIL 1913.

### 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 <sup>o</sup> .	Date 1915.		Cha- racter.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.	
									A <sub>E</sub> .	A <sub>N</sub> .		
					h	m	s		μ	μ		
48	3	April	I	e?								
				S?	0	7	55					
				M	0	7	59	5.5	5.9	17.2		
				F	0	24						
49	4	»	I,	P	0	6	59					
				S	0	7	18					
				M	0	9	7	5.5	14.4	17.2		
				F	0	22						
50	7	»	I	e	14	4						
				F	14	11						
51	7	»	I,	e P	14	55	56					
				e S	14	56	25					
				M	14	58		5	14.8	26.4		
				F	15	17						
52	7	»	I	e	17	10						
				F	17	50						
53	9	»	I	e	18	11						
				F	18	38						
54	10	»	I	e	15	41						
				F	15	49						
55	10	»	I	e	25	12						
				M	25	19		6	5.2	2.5		
				F	25	39						
56	11	»	I	e P	14	57	9					
				M	15	5		6	10.5	8.4		
				F	15	27						
57	15	»	I	e	7	5						
				F	7	5						
58	15	»	I,	P	21	43	24					
				S M	21	43	39	5	1.6	5.0		
				F	21	46						

No.	Date 1915.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.
									A <sub>E</sub> .	A <sub>N</sub> .	
59	15	April	I <sub>r</sub>	P S M F	h	m	s	4	10.1	51.6	
					22	12	22				
					22	12	45				
60	14	"	I	e M F	7	54		6	4.9	6.5	
					7	56					
					8	27					
61	14	"	I	P? S M F	13	58	57	3	1.2	4.5	
					15	58	42				
					15	42					
62	14	"	I <sub>r</sub>	P S M F	21	2	55	4	5.0	5.4	
					21	5	17				
					21	5	19				
63	14	"	I <sub>r</sub>	P? S M F	21	21	50	3	4.1	7.0	P is very small.
					21	21	41				
					21	21	42				
64	16	"	I	e M F	17	49		6	6.9	4.7	
					17	51					
					17	58					
65	17	"	I	P M F	12	55	10	6	16.4	11.6	Mindanao, Philippines.
					12	40					
					15	4					
66	18	"	I <sub>r</sub>	P S M F	15	19	55	6	57.9	66.1	N <sub>E</sub> of Mindanao, Philippines.
					15	24	25				
					15	25					
67	18	"	I	e F	15	45		5.5	52.5	79.1	S of Samar and N <sub>E</sub> of Mindanao, Philippines.
					15	52					
					19	8	1				
68	18	"	I <sub>r</sub>	P S M F	19	12	21	5	5.4	2.4	
					19	15					
					19	42					
69	18	"	I	P M F	22	58	4	5	5.4	2.4	
					22	41					
					22	54					
70	22	"	I <sub>r</sub>	P S M F	7	45	52	5	5.4	5.0	
					7	44	12				
					7	44	16				
71	24	"	II <sub>r</sub>	i P i S, M <sub>N</sub> M <sub>E</sub> F	0	52	45	6	225.5	212.6	Felt in Keboemen and Karanganyar in the residency of Kedoe, in Toeren and Kependjen in the residency of Pasoeroean, in Patjitan in the residency of Madioen, all in Java and in Den Pasar on the isle of Bali.
					0	54	2				
					0	54					

No.	Date 1915.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.
									A <sub>E</sub> .	A <sub>N</sub> .	
72	24	April	I	e F	h	m	s		μ	μ	N <sub>E</sub> of Mindanao.
					9	27	56				
73	24	"	I	e P M F	10	20	49	6	54.4	46.1	N <sub>E</sub> of Mindanao, Philippines.
					10	28					
					11	24					
74	24	"	I <sub>r</sub>	P e S M F	12	20	52	5	30.5	32.9	N <sub>E</sub> of Mindanao.
					12	25	17				
					12	27					
75	24	"	I	e F	17	5		6	9.8	11.6	N <sub>E</sub> of Mindanao.
					17	11					
					23	43					
76	24	"	I	e M F	23	49		6	9.8	11.6	N <sub>E</sub> of Mindanao.
					23	49					
					0	17					
77	25	"	I	e M F	0	45		6	9.5	9.5	N <sub>E</sub> of Mindanao.
					0	49					
					1	17					
78	25	"	II <sub>r</sub>	P M <sub>1</sub> M <sub>2</sub> S M <sub>3</sub> e L M <sub>L</sub> F	18	2	00	16	120.8	102.7	N <sub>E</sub> of Mindanao.
					18	5	16				
					18	6	52				
					18	6	45				
					18	8					
					18	11					
79	25	"	I	e M F	21	5		5.5	5.9	5.5	
					21	10					
					21	28					
80	26	"	I	e M F	5	51		6	5.2	6.1	
					5	58					
					4	8					
81	26	"	I	P S M	4	11	53	5	47.1	51.8	End overtaken by following earthquake.
					4	15	54				
					4	19					
82	26	"	I	M F	4	51		6	42.5	65.1	
					5	22					
83	26	"	I	e M F	11	57		6	6.5	8.8	
					11	59					
					11	47					
84	26	"	I	e M F	18	56		5.5	4.9	4.7	
					18	59					
					19	15					

N <sup>o</sup> .	Date 1915.		Cha- racter.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half).		Remarks.
									A <sub>E</sub> .	A <sub>N</sub> .	
85	27 April		I	e P	h	m	s	6	20.5	22.8	
					8	17	43				
					8	21					
					8	25					
86	27 "		I	e	13	1		6	5.6	2.8	
					M	15	10				
					F	15	27				
87	28 "		I	P	3	34	41	5.5	15.7	14.4	
					M	3	40				
					F	4	2				
88	28 "		I <sub>r</sub>	P	18	46	56	5.5	26.5	52.1	N <sub>E</sub> of Mindanao.
					S	18	49				
					M	18	51				
					F	19	26				
89	29 "		I <sub>r</sub>	P	3	15	47	6	21.5	26.1	N <sub>E</sub> of Mindanao.
					S	3	18				
					M	3	21				
					F	3	57				

# SEISMOLOGICAL BULLETIN.

## MAY 1913.

### 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 <sup>o</sup> .	Date 1915.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.	
									A <sub>E</sub> .	A <sub>N</sub> .		
					h	m	s		$\mu$	$\mu$		
90	6	May	I	e P	25	57	28	6	20.9	23.2		
					M	0	5					
					F	0	28					
91	9	»	I	e	11	11						
					F	11	25					
92	?	»	I	i P	18	47	3	5	25.2	31.1	Probably at 18 <sup>h</sup> 56 overtaken by other earthquake.	
					M	18	49					
					F	19	40					
93	14	»	I	e	9	12		5	9.0	7.6	Felt in western Luzon, Philippines.	
					M	9	19					
					F	9	53					
94	17	»	I	e	10	36		6	2.7	5.5	Felt in northeastern Mindanao, Philippines.	
					M	10	58					
					F	10	44					
95	17	»	I <sub>v</sub>	P	20	21	21	5	31.8	30.6		
					S	20	22					5
					M	20	24					
					F	20	59					
96	18	»	I <sub>v</sub>	P	2	17	15	6	74.0	65.5		
					S	2	23					42
					M	2	24					9
					F	5	3					
97	19	»	I <sub>v</sub>	P	11	50	54	5.5	60.6	66.7	Felt in Poeloe Tello, Padang, Poeloe Bodjo, Taloe and Indaroeng, Padangsche Benedenlanden, and in Loeboek Basoeng, Padangsche Bovenlanden, Sumatra.	
					S	11	55					58
					M	11	55					10
					F	12	55					
98	20	»	I <sub>v</sub>	P	14	19	52	1	6.0	5.2		
					S	14	19					40
					M	14	19					58
					F	14	24					

No.	Date 1915.		Character.	Phase.	Time (Greenwich).			Amplitude (half)		Remarks.	
								A <sub>E</sub> .	A <sub>N</sub> .		
					h	m	s	μ	μ		
99	21	May	I	e M F	13 14 14	57 1 29		6	6.4	3.8	
100	23	"	I <sub>v</sub>	P S M F	20 20 20 20	37 57 40 35	0 17	5	65.7	71.0	
101	24	"	I	e M F	23 23 24	44 47 0	47	3	4.1	6.9	
102	27	"	I	e F	19 19	1 9	38				
103	29	"	I	e M F	10 10 10	22 30 42		6	5.1	10.6	
104	29	"	I	e P M F	13 13 14	55 45 15	10	5.5	22.5	19.5	Felt in northern Luzon, Philippines.
105	30	"	II <sub>v</sub>	P S? M <sub>L</sub> F	11 11 12 15	55 58 15 18	40 20	4.0	585.5	588.2	Strong maximum in long waves.

# SEISMOLOGICAL BULLETIN.

## JUNE 1913.

### 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 1915.		Cha- racter.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.
									A <sub>E</sub> .	A <sub>N</sub> .	
106	2	June	II <sub>v</sub>	P	6	12	8	5.5	131.5	170.1	
				S	6	15	2				
				M	6	15					
				F	6	35					
107	3	»	I	P	14	20	1	5.5	5.4	5.8	
				M	14	22					
				F	14	34					
108	4	»	I <sub>r</sub>	P	10	4	52	6	56.4	40.1	
				e S	10	6	44				
				M	10	7					
				F	11	15					
109	9	»	I	e	5	34		6	5.8	4.0	
				M	5	38					
				F	5	50					
110	11	»	I	e	6	7		6	3.5	3.2	
				M	6	11					
				F	6	32					
111	12	»	I	e	4	35		5.5	5.6	2.9	Felt in Parigi, Manado.
				M	4	39					
				F	4	52					
112	13	»	I	e	1	25		5.5	9.2	7.4	In Malabar. e = 1" 25 <sup>m</sup> .
				M	1	25					
				F	1	35					
113	14	»	I <sub>n</sub>	e P	9	46	21	6	6.9	5.6	
				M <sub>L</sub>	10	0					
				M <sub>L</sub>	10	35					
				F	11	8					
114	17	»	I	e	9	10		6	5.5	4.8	
				M	9	19					
				F	9	35					
115	18	»	I	P	6	33		5	5.5	2.1	
				M	6	40					
				F	7	8					

No.	Date 1913.		Character.	Phase.	Time (Greenwich).			Amplitude (half)		Remarks.
								A <sub>E</sub> .	A <sub>N</sub> .	
116	19	June	I	e	h	m	s	$\mu$	$\mu$	
				F	3	12				
					3	22				
117	22	"	I	e	14	3				
				M	14	15		5.5	5.4	2.1
				F	15	8				
118	25	"	I	P	11	56	52			
				M	11	58		3	4.3	4.4
				F	12	1				
119	26	"	III <sub>a</sub>	P	5	9	12			Strong long waves.
				S	5	19	8			
				M <sub>1</sub>	5	20		7	240.5	121.9
				e L	5	33		35		
				M <sub>L</sub>	5	40		27	876.6	635.3
				F	7	48				

# SEISMOLOGICAL BULLETIN.

## JULY 1913.

### 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 1915.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.
									A <sub>E</sub> .	A <sub>N</sub> .	
120	1	July	I <sub>v</sub>	i P	0	4	54	6	7.5	16.0	
				i S	0	4	58				
				M	0	6					
				F	0	18					
121	1	»	I	e	4	5					
				F	4	18					
122	1	»	II <sub>v</sub>	i P	5	41	45	5.5	126.6	201.8	Malabar P—S = 12 sec.
				i S	5	42	1				
				M	5	44					
				F	6	1					
123	1	»	I <sub>v</sub>	P	8	52	17	5	16.5	8.9	Malabar P—S = 38 sec.
				e S	8	52	47				
				M	8	55					
				F	8	42					
124	5	»	I <sub>v</sub>	P	1	58	14	6	5.1	5.2	Felt in Soekaradja, near Soekaboemi (Preanger). Malabar P—S = 17 sec.
				M	1	59					
				F	1	46					
125	6	»	II <sub>v</sub>	P	16	17	58	6.5	92.2	180.9	
				S	16	21	42				
				M	16	24					
				F	17	1					
126	7	»	I	e	9	51		5.5	5.1	4.1	
				M	9	58					
				F	9	49					
127	7	»	I <sub>u</sub>	e P	17	45	8	5.5	14.7	14.0	
				e S	17	52	54				
				M	17	54					
				e L	17	59					
				M <sub>L</sub>	18	5					
F	18	12									
128	8	»	I <sub>u</sub>	P	22	16	32	6	17.7	18.5	
				S	22	25	15				
				M	22	25					
				M <sub>L</sub>	22	38					
				F	22	46					



N <sup>o</sup> .	Date 1915.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.
									A <sub>E</sub> .	A <sub>N</sub> .	
					h	m	s		μ	μ	
129	12	July	I <sub>u</sub>	e P	10	32	38	6.5	14.7	8.8	
				S	10	39	28				
				M	10	40	48				
				F	10	54					
130	19	"	I <sub>v</sub>	P	5	57	47	6	15.0	15.2	Felt in Manna, Benkoelen.
				S	5	38	34				
				M	5	40					
				F	5	46					
131	22	"	I	e	6	44		6	7.9	5.6	Registration of 20 July fails.
				M	6	49					
				M <sub>L</sub>	7	0	28				
				F	7	7					
132	23	"	I	e	18	44					
				F	18	40					
133	24	"	I	e	10	55	54	6.5	8.4	7.2	Felt in Banda Neira.
				M	11	5					
				F	11	20					
134	28	"	I	e	6	0					
				F	6	11					
135	28	"	I	e	12	9					
				F	12	36					
136	29	"	I <sub>r</sub>	P	22	10	55	6	14.0	17.7	
				S	22	15	25				
				M	22	17					
				F	22	37					

# SEISMOLOGICAL BULLETIN.

## AUGUST 1913.

### BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartaire.

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

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

WIECHERT Horizontal Pendulum, 1000 kilograms.

The symbols are according to WIECHERT.

No.	Date 1913.		Character.	Phase.	Time (Greenwich).			Amplitude (half)		Remarks.		
								A <sub>E</sub> .	A <sub>N</sub> .			
					h	m	s	μ	μ			
137	1	Aug.	I	e	17	22	10	5.5	9.2	9.9		
					M <sub>1</sub>	17	23					7
					M <sub>2</sub>	17	32					6
					F	17	45					
138	1	"	I	e	17	51		4	6.1	5.1		
					M	17	52					
					F	17	59					
139	2	"	I <sub>v</sub>	e P	5	46	51	6	6.5	10.4		
					S	5	47					8
					M	5	48					
					F	5	58					
140	4	"	I <sub>v</sub>	e P	21	19	25	6	31.0	34.9	Felt in Banda Neira.	
					M	21	21					
					F	21	40					
141	6	"	I <sub>u</sub>	i P	22	21	32	5	21.4	47.7	Peru.	
					S	22	35					18
					M	22	41					
					e L	22	58					
					M L <sub>1</sub>	25	22					60
					M L <sub>2</sub>	25	25					35
					M L <sub>3</sub>	25	47					17.5
7	"	"	"	F	0	45				Registration of 7 Aug. from 1 <sup>h</sup> 8 <sup>m</sup> till 12 <sup>h</sup> 55 <sup>m</sup> fails.		
142	7	"	I	e	14	42		6	26.1	33.5		
					M	14	49					
					F	15	18					
145	11	"	I <sub>v</sub>	P	6	52	45	6	52.7	20.8	Felt in Kalianda and Koe-pang, Lampong districts, Sumatra.	
					M	6	58					
					F	6	59					
144	13	"	III <sup>d</sup>	i P	4	26	10	?	?	?	Strait Soenda. The pendulum is put out of order immediately after the first shock. In Malabar S uncertain. Felt in Batavia as moderate shocks. Also felt in the residencies Batavia, Bantam and the Preanger Regentships and in Tandjong Radja res. Palembang, Sumatra.	
					F	6	15					

No.	Date 1915.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.
									A <sub>E</sub> .	A <sub>N</sub> .	
145	13	Aug.	I <sub>v</sub>	e	h	m	s		μ	μ	Very small period. In Malabar P-S = 25 sec. Of the same origine as 144.
				M	5	25	48				
				F	5	27					
146	13	"	I <sub>v</sub>	e	5	32					Probably of same origin as 144.
				F	5	35					
147	13	"	I <sub>v</sub>	e	5	44					"
				F	5	45					
148	13	"	I <sub>v</sub>	e P	7	11	53				Malabar P-S = 27 sec. Origin as 144.
				e S	7	11	54				
				M	7	15		1.5	9.0	12.5	
				F	7	15					
149	13	"	I <sub>v</sub>	e	7	35					
				F	7	37					
150	13	"	I <sub>v</sub>	e P	7	49	24				Malabar P-S = 26 sec. Origin as 144.
				S	7	49	41				
				M	7	50	7	1	4.9	5.7	
				F	7	55					
151	13	"	I <sub>v</sub>	e	9	46					Malabar P-S = 25 sec. End overtaken by second earthquake.
				M	9	48					
152	13	"	I <sub>v</sub>	e	9	59					
				F	10	8					
153	13	"	I <sub>v</sub>	P	16	46	59				Malabar P-S = 27 sec. Origin as 144.
				S	16	47	0				
				M	16	48		5	59.5	66.9	
				F	16	56					
154	14	"	I <sub>v</sub>	P	6	51	50				Malabar P-S = 27 sec. Origin as 144.
				S=M	6	52	7	2.5	13.2	46.5	
				F	6	58					
155	14	"	I <sub>v</sub>	e P	19	0	20				Felt in Rangkasbitoeng, Bantam. Malabar P-S = 25 sec.
				S	19	0	40				
				M	19	0	54				
				F	19	47					
156	15	"	I <sub>v</sub>	e	4	48	21				
				F	4	55					
157	25	"	I	e	8	0	52				No record from 18 Aug. 11 <sup>h</sup> 51 <sup>m</sup> till 20 Aug. 0 <sup>m</sup> 48 <sup>m</sup> by stopping and cleaning of clockwork; Records of 24 Aug., 25 Aug. from 14 <sup>h</sup> 49 <sup>m</sup> and 26 Aug. from 8 <sup>h</sup> 25 <sup>m</sup> unreadable for pendulum touching adjusting screws.
				M	8	5		7	21.5	12.0	
				F	8	13					

No.	Date 1915.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.
									A <sub>E</sub> .	A <sub>N</sub> .	
158	27	Aug.	II <sub>v</sub>	P	h	m	s		μ	μ	
				S?	20	18	28				
				M	20	19	13				
				F	20	22		7	210.8	71.7	Malabar P-S = 45 sec.
				F	20	51					
159	30	"	II <sub>v</sub>	i P	11	37	58				Malabar P-S = 15 sec. Felt in Buitenzorg and in Garoet, Soekaboemi, Tjipetir, Tjikorai, Singaparna and Tjibadak, Preanger Regentships.
				i S	11	38	5				
				M	11	39	25	6	188.2	60.6	
				F	11	51					
160	31	"	I <sub>u</sub>	P	6	15	40				
				M	6	22		6.5	33.9	20.6	
				e <sub>L</sub>	6	35					
				M <sub>L</sub>	6	44		13	45.8	21.4	
				F	7	15					
161	31	"	I	e	17	21	6				
				M <sub>E</sub>	17	22	10	6.5	22.6		
				N <sub>N</sub>	17	28		6.5		19.1	
				F	17	55					

# SEISMOLOGICAL BULLETIN.

## SEPTEMBER 1913.

### 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 1913.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.
									A <sub>E</sub> .	A <sub>N</sub> .	
162	1	Sept.	I <sub>v</sub>	e P	h	m	s	5.5	6.4	8.2	Felt in Tjikorai and Garoet, Preanger Regentships.
				e S	12	13	7				
				M	12	14	13				
				F	12	18					
163	2	"	I	e	19	12		30	16.4		
				e L	19	18					
				M <sub>L</sub>	19	27					
				E	19	35					
164	3	"	II <sub>r</sub>	P	20	59	49	6	27.6	41.5	
				S	21	6	58				
				M	21	7					
				e L	21	8					
				M L <sub>1</sub>	21	14					
				M L <sub>2</sub>	21	20					
165	3	"	I <sub>v</sub>	P	21	30	25	6	30.5	33.5	End overtaken by following earthquake.  Malabar P—S = 32 sec.
				i S	21	30	50				
				M	21	32					
				F	21	50					
166	4	"	I <sub>r</sub>	e	11	54				Western of Luzon. Resembles to strong mi- croseismic movement.	
				M	11	59					
				F	12	8					
167	5	"	I <sub>v</sub>	P	6	47	42	6.5	13.1	13.2	P a little uncertain by hourmark.
				i S	6	48	14				
				M	6	49	14				
				F	6	54					
168	6	"	I <sub>v</sub>	P	17	40	21	6	1.7	2.5	
				i S	17	40	42				
				M	17	42					
				F	17	46					
169	6	"	I <sub>v</sub>	P	18	25	43	6	8.4	9.6	
				i S	18	26	4				
				M	18	27					
				F	18	33					

No.	Date 1913.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.		
									A <sub>E</sub> .	A <sub>N</sub> .			
170	6	Sept.	I <sub>v</sub>	P	h	m	s	6	μ	μ			
				i S	20	52	12		7.7	8.1			
				M	20	52	55						
				F	20	54	39						
171	6	"	I <sub>v</sub>	P	23	25	40				P uncertain by smallness.		
				i S	23	26	2						
				F	23	29							
172	13	"	I <sub>v</sub>	P	2	6	14	6.5	30.2				
				M <sub>EW</sub>	2	9							
				e L	2	10							
				M <sub>NS</sub>	2	11						6.5	25.8
				M <sub>L</sub>	2	18							
F	3	43											
173	14	"	I <sub>v</sub>	P	10	51	57	6	3.4		Very small.		
				S	10	51	59						
				M	10	52	37						
				F	10	55							
174	19	"	H <sub>v</sub>	P	20	21	20	5.5	82.5	70.5			
				S?	20	21	40						
				M	20	23							
				F	20	38							
175	21	"	I <sub>v</sub>	P	13	4	55	6	4.4	5.1	P uncertain by smallness.		
				i S	13	4	57						
				M	15	6							
				F	15	10							
176	26	"	I	e	22	0		6.5	8.0	5.6	Registration fails from 22 Sept. 8 <sup>h</sup> till 23 Sept. 1 <sup>h</sup> .		
				M	22	2							
				F	22	6							

# SEISMOLOGICAL BULLETIN.

## OCTOBER 1913.

### 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 <sup>o</sup> .	Date 1913.	Cha- racter.	Phase.	Time (Greenwich).			Period in seconds.		Amplitude (half).		Remarks.		
							A <sub>E</sub> .	A <sub>N</sub> .	A <sub>E</sub> .	A <sub>N</sub> .			
				h	m	s			μ	μ			
177	1	Oct.	I	e	21	55							
				M	22	2		6	8.8	6.9			
				F	22	15							
178	2	»	I	e	4	45							
				M	4	58		6.5	17.2	9.9			
				e L	5	13							
				M L <sub>1</sub>	5	19		12		5.4			
				M L <sub>2</sub>	5	55		21		4.0			
F	6	28											
179	5	»	I	e	9	6							
				M	9	8		6.5	4.8	5.0		Felt at Loeboek Kilangan and Padang, West Coast of Sumatra.	
				F	9	18							
180	5	»	I <sub>v</sub>	P	16	25	2					P uncertain by smallness.	
				S	16	25	19						
				M	16	25	45		5	6.5	8.2		Malabar P—S = 13 sec.
				F	16	29							
181	9	»	I	e	22	45							
				M	22	52							
				F	23	18							
182	11	»	I <sub>r</sub>	P	1	42	45						Malabar P—S = 6 <sup>m</sup> 5 <sup>s</sup> .
				S	1	49	16						
				M	1	52		6.5	16.8	27.7			
				e L	1	55							
				M L	2	2		25	151	24.2			
F	2	55											
185	11	»	I <sub>r</sub>	P	4	14	8						Malabar P—S = 6 <sup>m</sup> 9 <sup>s</sup> .
				S	4	20	21						
				M	4	22		5	51.2	45.4			
				e L	4	28							
				M L	4	55		17	35.5	28.0			
				F	4	55							
184	11	»	I <sub>u</sub>	P	9	19	45						
				S	9	27	54						
				M	9	29		7	9.6	13.5			
				e L	9	55							
				M L	9	55		12	11.6	20.7			
				F	10	25							

No.	Date 1913.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.
									A <sub>E</sub> .	A <sub>N</sub> .	
185	14	Oct.	II <sub>v</sub>	i P	8	18	56	6	>196	289	
				i S	8	27	4				
				M	8	27	55				
				e L	8	54					
				M <sub>L</sub>	8	45					
F	10	8		23	137	105					
186	21	"	I <sub>v</sub>	P	5	5	51	2	16.5	14.9	Malabar P—S = 23 sec. Falt at Tjibalieng, Batam, Java.
				S	5	6	12				
				M	5	6	50				
				F	5	15					
187	21	"	I	e	8	24	6	9.2	6.0	Falt at Gorontalo, Manado, Celebes.	
				M	8	30					
				F	8	41					
188	22	"	I <sub>r</sub>	e P	6	59	6	9.9	24.5	Felt at Toli-Toli, Manado, Celebes. Possible i S belongs to a new aearthquake, which overtakes the end of the former.	
				i S	7	5					29
				M	7	5					
				F	7	18					
189	22	"	I <sub>v</sub>	P	22	20	29	5	4.4	5.5	P and S a little uncertain by smallness. Malabar i P—i S = 10 sec. Falt at Tjikorai, Preanger Regentships.
				S	22	20	55				
				M	22	22					
				F	22	26					
190	25	"	I	e	12	49	5	4.0	2.5		
				M	12	51					
				F	12	59					
191	27	"	I <sub>v</sub>	P	17	50	4	3	17.2	17.2	S uncertain. Malabar P—S = 27 sec.
				S	17	50	25				
				M	17	51	19				
				F	18	0					
192	29	"	II <sub>r</sub>	P	4	54	57	6	121	108	S uncertain. Felt at Poelo Bodjo, Taloe, Telok Dalam, South-Nias, and Poeloe Tello, West Coast of Sumatra.
				S	4	57	2				
				M	4	40					
				e L	4	46					
				M <sub>L</sub>	4	56					
				F	6	8					

# SEISMOLOGICAL BULLETIN.

## NOVEMBER 1913.

### 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 <sup>o</sup> .	Date 1913.		Cha- racter.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.
									A <sub>E</sub> .	A <sub>N</sub> .	
193	2	Nov.	I <sub>r</sub>	e	h	m	s		μ	μ	Resembles strong micro- seismic movement. Felt in Poelo Bodjo, West Coast of Sumatra.
				M	17	35					
				F	17	39		6	6.4	7.0	
194	3	"	I	e	19	5					
				M	19	8					
				F	19	16		6	12.7	18.5	
195	4	"	I <sub>r</sub>	e	7	38					Felt in Laboeha, Ternate.
				M	7	41					
				F	7	48		5	25.1	14.5	
196	6	"	I <sub>u</sub>	i P	10	36	7				Malabar P. S. 8 <sup>m</sup> 38 sec.
				i S	10	44	48				
				M	10	46					
				F	11	5		6	12.5	14.5	
197	6	"	I <sub>v</sub>	P	16	12	35				
				S?	16	13	15				
				M	16	15	0				
				F	16	26		6	25.4	30.0	
198	8	"	I <sub>v</sub>	P	2	34	31				P uncertain by smallness.
				S	2	34	52				
				M	2	35	25				
				F	2	52		6	2.5	3.4	
199	9	"	I <sub>v</sub>	P	23	25	31				P uncertain by smallness.
				S	23	26	8				
				M	23	28					
				F	23	40		6	8.0	6.6	
200	10	"	I <sub>u</sub>	i P	21	22	44				
				i S	21	30	55				
				M	21	33					
				e L	21	36					
				M <sub>L</sub>	21	48					
				F	22	48		21	28.8	34.6	
201	12	"	I	e P	23	38	30				
				M	23	41					
				F	23	48					



No.	Date 1915.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.
									A <sub>E</sub> .	A <sub>N</sub> .	
202	15	Nov.	I <sub>v</sub>	P	h	m	s		μ	μ	
				S ?	1	29	57				
				M	1	30	1	5	16.8	14.5	
				F	1	32					
205	14	"	I	e	20	56					
				M	21	6	6	7.2	5.2		
				F	21	28					
204	15	"	I <sub>v</sub>	P	0	41	26				Malabar P—S = 24 sec.
				S	0	41	44				
				M	0	44		6.5	25.1	22.9	
				F	1	0					
205	15	"	I <sub>u</sub>	P	5	37	18				
				S	5	45	37				
				M	5	47		6	39.0	18.2	
				e L	5	50					
				M <sub>L</sub>	6	5		20	14.8	14.3	
				F	6	33					
206	15	"	I <sub>v</sub>	P	19	20	29				
				i S	19	20	50				
				M	19	21		< 1			
				F	19	25					
207	16	"	I <sub>v</sub>	P	1	10	37				
				S	1	10	58				
				M	1	13		6	36.7	37.0	
				F	1	25					
208	17	"	I	e	21	9					
				M	21	14		6	6.4	4.7	
				e L	21	15					
				M <sub>L</sub>	21	36		18	4.5	5.2	
				F	22	3					
209	18	"	I <sub>v</sub>	P	17	45	57				
				S	17	46	35				
				M	17	47		6	10.6	18.7	
				F	17	56					
210	19	"	III <sub>r</sub>	i P	3	23	57				Felt in Posso, Kolonedale, Kolaka, Banggai, Kandari, Gorontalo and Donggala, Celebes.
				S	3	27	18				
				M	3	32		12	>274	315	
				F	4	58					
211	20	"	I <sub>v</sub>	P	10	57	12				Felt in Soengei Limau, West Coast of Sumatra.
				S	10	59	34				
				M	11	1		6	6.1	4.2	
				F	11	11					
212	21	"	I <sub>v</sub>	P	22	54	24				Malabar P—S = 8 sec. Felt in Tjikorai, Preanger Regentships.
				i S	22	54	45				
				M	22	56		5.5	45.1	35.0	
				F	23	2					
213	23	"	I	e	21	39					
				M	21	40		6	6.1	7.5	
				F	21	44					
214	26	"	I <sub>r</sub>	e P	19	0	51				S E of Samar.
				S	19	5	26				
				M	19	8		5	6.0	9.8	
				F	19	25					

# SEISMOLOGICAL BULLETIN.

## DECEMBER 1913.

### 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.

N <sup>o</sup> .	Date 1913.		Character.	Phase.	Time (Greenwich).			Period in seconds.		Amplitude (half).		Remarks.
								A <sub>E</sub> .	A <sub>N</sub> .	A <sub>E</sub> .	A <sub>N</sub> .	
					h	m	s		μ	μ		
215	2	Dec.	I	e F	20	8					Very small.	
216	3	"	I <sub>r</sub>	P S M F	8	9	57	6.5	10.0	8.0		
217	6	"	I <sub>u</sub>	e P S M F	14	25	17	6	13.6	6.4		
218	9	"	I <sub>u</sub>	e P S M e L M L F	4	44	27	6	10.2	13.3		
					5	5		22	7.7			
					5	8						
					5	23						
219	10	"	I <sub>u</sub>	e P S? M e L M L <sub>1</sub> M L <sub>2</sub> M L <sub>3</sub> F	6	19	29	6	11.0	9.6		
					6	28	7					
					6	29						
					6	38						
					6	41		22	11.6	16.2		
					6	45		18	25.8	34.6		
					7	3		14	4.7	6.8		
					7	28						
220	11	"	I <sub>v</sub>	e P S M F	11	13	32				Malabar P-S = 13 sec.	
					11	14	6					
					11	18		5	4.0	7.7		
					11	20						
221	15	"	I <sub>r</sub>	P S M F	17	30	17					
					17	35	33					
					17	56		5.5	8.2	9.3		
					18	11						
222	16	"	I <sub>v</sub>	P S M F	21	8	56					
					21	9	16					
					21	11		5.5	5.5	5.1		
					21	16						

No.	Date 1913.		Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Remarks.
									A <sub>E</sub> .	A <sub>N</sub> .	
223	20	Dec.	I	e	h	m	s	6	4.9	7.8	
					23	50					
				M	23	52					
				F	0	3					
224	21	"	II <sub>v</sub>	i P	15	13	20	6	112.6	123.4	Malabar P—S = 11 sec.
				i S	15	13	46				
				M	15	16					
				F	15	36					
225	21	"	III <sub>n</sub>	P	15	44	15	10	>265	265	Immediately after S the E W comp. touches adjusting screws.
				S	15	55	45				
				M	15	58					
				F	16	55					
226	21	"	I	e	17	19	7	19.8		E. W. comp. still touches adjusting screws.	
				M	17	22					
				F	17	28					
227	27	"	I <sub>v</sub>	i P	9	54	30	6	28.7	70.4	
				i S	9	55	34				
				M	9	56					
				F	10	15					
228	28	"	I	e	17	45	11	8.7	8.7		
				M	17	55					
				F	18	10					
229	29	"	I <sub>v</sub>	P	8	6	51	6	31.7	13.3	Malabar P—S = 15 sec.
				S = M	8	6	57				
				F	8	15					
230	30	"	I <sub>v</sub>	P	18	22	50	5	31.3	20.1	Malabar P—S = 16 sec.
				S	18	25	21				
				M	18	26					
				F	18	39					
231	30	"	I	e	20	28	6	4.2	2.7		
				M	20	31					
				F	20	36					

The constants, that were used this year, will be given in the next bulletin.