

SEISMOLOGICAL BULLETIN 1922.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.

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

E. Longitude $7^{\text{h}} 7^{\text{m}} 21^{\text{s}}$.

WIECHERT Horizontal Pendulum, 1000 kilograms.

PREFACE.

The astatic seismograph of WIECHERT of 1000 K.G. is registering regularly since December 6th 1908.

The instrument is mounted on a heavy brick pillar in a room with thick walls (about 70 centimeters), that 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 oberver 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 through a drop of mercury.

For each month the mean constants for that month are applied. 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, giving the pendulum a displacement by means of the horizontal adjusting screws, the value of which can be determined easily form the pitch (a), 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 mm; (b) = 1225 mm; (c) = 895 mm.

The constants used in 1921 are given below.

1921.	E-W component.			N-S component.		
	V.	T_0 .	ϵ .	V.	T_0 .	ϵ .
January	218	8.0	4.7	209	8.0	4.2
February	"	7.8	4.5	"	7.9	"
March.	"	7.6	4.2	"	7.7	4.0
April.	"	7.1	4.6	"	7.9	4.1
May.	"	7.0	4.4	"	7.6	4.7
June.	"	7.2	4.0	"	7.7	5.0
July.	"	7.0	4.2	"	"	5.2
August	"	"	4.1	"	7.8	4.8
September	214	"	4.8	195	7.6	4.5
October.	"	6.9	4.1	"	7.3	4.1
November	"	6.7	"	"	7.0	3.9
December.	"	6.6	"	"	"	4.0

The constants for 1922 will be given at the end of the year

The notation used 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.

MALABAR.

July 1911 an astatic WIECHERT pendulum of 100 K.G. which is the possession of Mr. K. A. R. BOSSCHA, chief manager of the tea estate Malabar (Præanger, Java; E. Long. 107° 37'; S. Lat. 7° 13') has been erected.

Particulars about the registrations have been put under the remarks.

JANUARY 1922.

N ^o .	Date 1922.	Char- acter.	Phase	Time (Greenwich).			Period in seconds.	Amplitude (half)		Distance of epi- centrum	Remarks.
								A _E	A _N		
				h	m	s		μ	μ		
1	Jan. 1	I	e _E	12	11	36					
			i _E	12	12	36					
			i	12	13	49					
			F	12	35						
2	" 1	I	i _E	19	58	13					
			i	20	7	50					
			i _E	20	9	7					
			eL	20	17						
			F	20	52						
3	" 3	I _n	iP	21	7	32				7260	ESE -- WNW.
			i	21	10	44					
			iS	21	16	11					
			i _N	21	16	32					
			F	21	26						
4	" 5	II _v	iP _E	23	53	59				500	EW.
			iS _N	23	54	32					Benkoelen (Sumatra).
			M	23	56	46	6.4	567	290		
			F	0	27						
5	" 8	II _v	P	23	10	21					± EW.
			i _N	23	10	40					
			M	23	12	50	5.3	210	264		
			F	23	28						
6	" 6	I	e	14	30	43					
			i	14	36	52					
			eL	15	29	53					
			M	15	34	23					
			C _E	15	40	53					
			C _E	15	56	9					
			F	15	57	53					
7	" 6	II _v	P	16	44	13					
			F	16	50						
8	" 7	I _v	e	8	53	29					
			m	8	40	30					
			F	8	42						
9	" 7	I _v	P _E	9	25	50					
			i _N	9	58	29					
			i	9	52	37					
			F	9	41						
10	" 8	I	e	2	7,8						e and i troubled by street traffic.
			i	2	17,9						
			F	2	22						
11	" 9	I _n	e	5	28	16					
			L	6	27	14					
			eL _N	6	53	43					
			F	6	56						
12	" 10	I	e	13	47	36					
			F	14	2						

No.	Date 1922.	Char- acter.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
								A _E	A _N		
13	Jan. 14	I _u	P iS i _N F	h 6 6 6	m 36 45 46	s 40 55 51		μ	μ	7570	
14	" 14	I _u	e ₁ e ₂ M ₃ F	20 20 20 20	31 35 37 54	47 42 0					
15	" 17	II _u	P i ₁ i ₂ i ₃ i ₄ i ₅ i _E eL F	4 4 4 4 4 4 4 4 5	9 10 11 14 15 19 35 43 54	59 10 42 59 50 42 15				EW.	
16	" 19	I	e F	1 1	5 9	5					
17	" 19	I	e F	3 3	36 39	27 4					Southern Celebes.
18	" 19	I	i F	6 6	35 38	4					
19	" 19	II	e _E i _E i _N i _N F	22 22 22 22 0	5 7 13 15 28	47 16 39 6					
20	" 20	I	i _E M F	7 7 7	0 8 27	54 23					
21	" 22	I	i eL F	3 3 4	35 56 13	38 59					
22	" 22	I	e i _N M F	14 14 14 14	40 44 46 53	27 16 39					
23	" 22	I	e e _N i _E F	20 21 21 21	56 5 6 18	20 38 26					
24	" 22	I	e F	21 21	23 38	25					
25	" 22	I	e i F	22 22 22	14 22 30	46 18					
26	" 23	I	e i F	3 3 3	42 47 57	52 27					

No.	Date 1922.	Char- acter.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
								A _E	A _N		
27	Jan. 23	I	i F	h 16 16	m 44 56	s 26		μ	μ		
28	" 26	I _r	P iS F	8 8 8	40 44 49	39 54				2450	troubled by street traffic. Taroena, (Sangi Isles).
29	" 27	I _v	eP iS M F	18 18 18 18	27.5 27.7 28.9 30					± 200	no minute marks. NS. Malabar iP — iS = 11 sec. Δ = 90. Preanger (Java).
30	" 27	I _v	eP _N iS i F	18 18	50.4 50.8 52.3 54.9					± 200	no minute marks. Malabar P — S = 11 ec. Δ = 90. Tjisaroeni (Preanger) Java.
31	" 28	I _v	eP iS M F	6 6 6 6	23 24 25 28	54 17 56				200	
32	" 31	I	P F	2 2	12 18	51					
33	" 31	I _u	P _E i ₁ i ₂ i ₃ eL L eL _N F	15 13 13 13 14 14 14 14	38 48 54 56 8 20 29 48	41 54 46 46 41 41 41					
34	" 31	I _v	eP i F	15 15 16	47 47 50	25 45					
FEBRUARY 1922.											
35	Feb. 5	II _r	P eS i F	3 3 3 4	42 44 47 8	23 55 31				1470	Malabar P — S = 1 ^m 53 sec. Δ = 1070. South Celebes and Eastern Soenda Isles.
36	" 7	I	e F	5 5	20 24	18					
37	" 14	I	e i F	12 13 13	52 0 36	53 7					
38	" 14	I _v	P iS F	18 18 18	49 50 55	9 1				470	Malabar iS — eP = 46 sec. Δ = 410.
39	" 19	I _v	P F	18 18	30 38	25					

N ^o .	Date 1922.	Char- acter.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half).		Distance of epi- centrum.	Remarks.
						A _E	A _N		
				h m s		μ	μ		
40	" 20	I _u	i _E i ₁ i ₂ F	7 55 46 8 5 57 8 6 20 8 10 20					
41	" 27	I _r	iP i F	20 45 5 20 50 40 20 58					ENE. Eastern Menado.
MARCH 1922.									
42	March 2	I _Δ	iP F	14 33 27 14 38					
43	" 4	I	e F	5 20 33 5 28					
44	" 4	II _u	iP iS F	13 18 47 13 27 50 14 1				7720	SW — NE. Malabar S — P = 9 ^m 6 sec. PR ₁ — P = 2 ^m 49 sec. Δ = 7790.
45	" 4	I	i _N i _E F	22 26 30 22 28 28 22 33					
46	" 5	I	e i F	9 22 30 9 24 13 9 31					
47	" 5	I	e i _E i F	10 15 9 10 16 6 10 16 27 10 23					
48	" 6	I	i _E i _E F	21 31 2 21 32 0 21 34					
49	" 7	I	i _E i _E i _E i _E F	22 27 55 22 31 22 22 37 25 22 38 58 22 40					
50	" 8	I _v	iP iS F	11 16 48 11 17 8 11 22				180	NS. Malabar iS — iP = 16 sec. Δ = 130; ± EW. Preanger.
51	" 10	I _u	iP iS i F	17 3 8 17 11 50 17 15 15 17 28				7300	EW. Malabar iP — iS = 8 ^m 36 sec. Δ = 7200.
52	" 17	I _Δ	i F	21 10 8 21 15					
53	" 26	I _r	P S F	11 18 15 11 21 33 11 31				1990	± EW. Wonreli (Kisar).

N ^o .	Date 1922.	Char- acter.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
						A _E	A _N		
				h m s		μ	μ		
54	March 26	I _Δ	e F	14 1 31 14 5					
55	" 28	I	P F	4 17 36 4 54					
56	" 29	I	e i M F	7 42 12 7 46 3 7 47 12 7 53					
57	" 30	I	P e _N F	15 38 34 16 0 1 16 5					
58	" 31	I	e i F	20 42 38 20 46 43 20 56					
APRIL 1922.									
59	April 1	I _v	iP _N iS F	7 9 41 7 10 2 7 12				190	NS. Malabar iS — eP = 20 sec. Δ = 180. Tjiletoeh (Preanger), Java.
60	" 2	I	e ₁ e ₂ F	19 34 0 19 42 29 19 51					
61	" 3	I _v	i _E F	9 50 34 8 53					Malabar iS — P = 11 sec. Δ = 90. Preanger (Java).
62	" 5	II _u	i _E i _N i _E i i eL F	10 5 47 10 6 11 10 6 57 10 12 12 10 13 32 10 18 10 48				6.3	Malabar i — P = 10 ^m 38 sec.
63	" 6	I _v	e F	22 11 24 22 21					Mamoedjoe (Central Celebes).
64	" 7	I _v	P F	0 4					P during changing of papers. Mamoedjoe (Central Celebes).
65	" 7	I	P F	16 4 46 16 14					
66	" 8	III _v	iP iS? M F	3 34 6 3 34 43 3 35 43 4 6				330?	± WNW. Benkoelen.
67	" 10	I	P F	4 3 4 18				4.0	P disturbed by street traffic.

N ^o .	Date 1922.	Char- acter.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
								A _E	A _N		
68	April 10	I _v	P iS F	h 16 16 16	m 16 16 28	s 20 48		μ	μ	250	Malabar S — iP = 28 sec. Δ = 250; EW.
69	" 11	I _u	e _E e i F	0 0 0 0	28 36 37 41	42 28 51					
70	" 13	I	i _E i F	5 6 6	13 18 28	5 38					
71	" 17	I	iP i M F	20 20 20 20	58 38 40 51	22 40 47	5.0				EW.
72	" 19	I	e F	16 17	58 5	48					
73	" 19	I _v	P iS F	19 19 19	26 27 31	52 15				190	
74	" 22	I _v	iP iS M F	2 2 9 9	27 28 29 35	51 11 21	5.7			180	NS. Malabar iS — P = ± 14 sec. Δ = 120. Preanger and Buitenzorg (Java).
75	" 22	I _v	eP F	10 10	20 27	36					Taroena, Sangi Isles.
76	" 22	I _v	i _N F	21 21	14 17	30					
77	" 23	I _v	i ₁ i ₂ i ₃ i ₄ i ₅ eL F	21 21 21 21 21 21 22	56 57 58 40 45 51 8	21 4 5 38 39					
78	" 25	I _v	e _E i i _N eL F	21 21 21 21 21	29 56 38 44 in next.	7 10 1 2					no minute marks.
79	" 25	I	e _E i _N i eL F	21 21 22 22 22	49 56 1 8 58	32 59 25 5					no minute marks.
80	" 26	I	e i F	4 4 4	15 24 29	54 50					
81	" 29	I	eP F	23 23	37 46	44					

MAY 1922.											
N ^o .	Date 1922.	Char- acter.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
								A _E	A _N		
82	May 2	II _u	eP i eS? M F	h 11 11 11 11	m 16 22 25 28	s 57 11 52 5 57		μ	μ	7570?	Malabar i _N — e _N = 9 ^m 15 sec. i — e _N = 9 ^m 29 sec. L — e _N = 14,1 ^m .
83	" 2	I _v	e S	21 21 21	10 11 14	50 6				140	± EW. Malabar iS — iP = 10.5 sec. Δ = 130. Preanger (Java).
84	" 3	I	e F	16 16	23 58	46					
85	" 4	I	e i ₁ i ₂ F	0 0 0 0	40 41 43 49	38 43 2					
86	" 4	I _v	P iS F	2 2 2	35 37 43	(57) 10				(110)	EW; troubled by street traffic. Kroe (Benkoelen), Sumatra.
87	" 4	I _u	iP i iS F	9 9 9 9	23 26 32 44	45 23 35				7480	
88	" 5	I _v	eP i _N eL F	14 14 14 15	50.1 54.0 58.4 4						EW. no minute marks. Amboina and Amahei (Ceram).
89	" 6	I _v	iP F	3 3	8 12	42					
90	" 7	I	e F	16 17	54.7 6						no minute marks.
91	" 8	I _v	e iS F	2 2 2	4 5 10	49 30				360	Malabar iS — eP = 40 sec. Δ = 350.
92	" 8	I _v	P F	15 15	54 41	38					
93	" 9	III _v	P eS M F	13 13 13 14	53 55 57 53	24 53 50	5.6	415	538	1230	EW. Malabar S — P = 2 ^m 2 sec. Δ = 1160. Kediri (Java) — Soemba Isles and Southern Celebes.
94	" 10	III _v	iP iS M F	9 9 9 9	21 22 24 50	56 42 47	6.2	178	510	510	Malabar S — iP = 1 ^m 24 sec. Δ = 590. Preanger (Java) — Bali Isles.

No.	Date 1922.	Char- acter.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.			
						A _E	A _N					
95	May 11	I _u	e	h m s					Troubled by street traffic.			
				9 25.5								
				i ₁ 9 54 1								
				i ₂ 9 54 52								
				i ₃ 9 55 44								
				L 9 45 32								
				M ₁ 9 49 40						6.6	118	45.8
				M ₂ 9 50 42						6.6	67.2	149
				i 9 54 36								
				eL _N 10 8 52								
F 10 15												
96	" 12	I _u	i	18 49 52				7160	Malabar i ₁ — i _N = 2 ^m 12 sec. i ₂ — i _N = 8 ^m 16 sec. eL — i _N = 15 ^m .			
				i _E 18 55 5								
				iS 18 58 26								
				i 19 0 59								
				L 19 3 7								
				M ₁ 19 10 57						30.0		
				M ₂ 19 15 57						17.6	94.9	117
				F 19 48								
97	" 14	I _v	iP _E	15 0 14				170				
				iS _N 15 0 53								
				F 15 9								
98	" 14	I _v	e _E	15 44 41					Lais (Benkoelen) Sumatra.			
				F 15 51								
99	" 16	I _r	eP	8 13 2				4070				
				iS 8 18 42								
				F 8 27								
100	" 17	I _v	e _E	11 51 50					Malabar iS — eP = 7 sec. △ = 60. Tjikentjreng (Preanger) Java.			
				F 11 55								
101	" 18	I _r	eP	15 16.2				2540	no minute marks. Malabar iS — eP = 2 ^m 49 sec. △ = 1660. Menado (Celebes).			
				iS 15 20.0								
				i 15 24.4								
				F 15 56.6								
102	" 21	I _r	eP	5 14.1				2520	Taroena (Sangi I.) and Menado.			
				i 5 16 18								
				iS 5 18 6								
				F 5 26								
103	" 24	I	i ₁	15 29 21								
				i ₂ 15 53 55								
				F 15 41								
104	" 25	I _v	i	20 10 55					Malabar iS — eP = 14 sec. △ = 120.			
				F 20 14								
105	" 29	I	i _N	20 33 50					Gorontalo (Menado)?			
				F 20 39								
JUNE 1922.												
106	June 2	II _r	iP	20 17 7				2720	NE. Malabar S — P = 4 ^m 12 sec. △ = 2690.			
				i ₁ 20 18 28								
				i ₂ 20 18 47								
				iS 20 21 25								
				M 20 24 6						6.1	253	87.7
				F 20 55								

No.	Date 1922.	Char- acter.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
						A _E	A _N		
107	June 4	I _v	iP	h m s		μ	μ	180	EW; troubled by street traffic.
				25 54.9					
108	" 5		iS	23 55 17					
				F 0 0					
109	" 8	I _v	eP	18 9.1					Malabar S — eP = 49 sec. Δ = 450. Pekalongan and Madioen-Besoeki (Java).
				i _E 18 10 6					
				F 18 14					
110	" 12	I	i _E	5 9 16					other phases troubled by street traffic.
111	" 16	I	e	12 55 42				2780?	EW. Kau (Tobelo), Halmaheira.
				F 12 41					
				iP 2 59 28					
				i _E 2 41 7					
112	" 17	I _r	iP	2 45 47				2500	EW. Malabar S — P = 3 ^m 55 sec. Δ = 2450.
				iS? 2 50					
				F 2 50					
113	" 24	I _r	P	16 32 18					Pino (Benkoelen) Sumatra.
				iS 16 56 18					
				F 16 50					
114	" 25	I _v	eP	16 54 53					troubled by street traffic. Madioen-Pasoeroean (Java).
				i 16 55 46					
				F 17 1					
115	" 26	I _v	P	12 5.0					
				F 12 5					
116	" 27	II _r	iP	14 55 9				2750?	
				i 14 57 1					
				S? 14 59 26					
				F 15 8					

LOGICAL BULLETIN 1922.

BATAVIA OBSERVATORY, JAVA.

JULY à décembre.

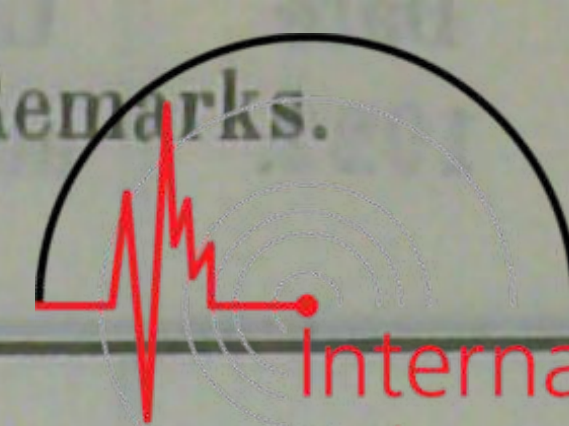
No.	Date 1922.	Char- acter.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Distance of epi- centrum	Remarks.
								A _E	A _N		
				h	m	s	KM.	μ	μ	KM.	
116	July 2	I _u Δ	e i eL F	13 14 14 14	53 2 25 57	45					
117	" 2	I _v	iP F	15 16	58 0	7					Malabar S — P = 44 sec. Δ = 120.
118	" 3	I	i _E i F	5 5 5	37 37 59	0 45					
119	" 3	I _r Δ	e F	13 13	45 57	56					Golohaya (Soela I, Moluccas)?
120	" 5	I	P i F	6 6 6	58,5 39 44	+0					in minute mark.
121	" 5	I _v	eP _E i _N S i F	14 14 14 14 14	44 45 45 46 57	18 4 59 2				950	Malabar S — P = 1 ^m 57 sec. Δ = 910. Den Pasar (Bali Isles).
122	" 9	I _r Δ	P _E iS F	3 3 3	44 47 57	42 48				1850	
123	" 11	I	iP F	14 14	20 35	47					
124	" 13	II _r Δ	P iS eL F	5 5 5 5	3 7 21 38	(9) 7 27				2490	Troubled by street traffic.
125	" 13	I _r	e F	10 10	52 58	10					Northern Sumatra.
126	" 14	I	e _E F	2 2	42 47	49					
127	" 14	I _v	e i F	3 3 3	50 55 48	52 22					
128	" 18	I _r	P _E S F	18 18 18	30 50 55	42 57				130	
129	" 18	I _r Δ	e i F	22 22 22	16 16 24	14 46					Menado

N ^o .	Date 1922.	Char- acter.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
								A _E	A _N		
				h	m	s		μ	μ		
130	July 19	I _v	e	13	1	54					
			i _N	13	7	42					
			F	13	16						
131	" 20	I	i _E	8	41	46					
			F	8	49						
132	" 23	I _v	P	7	7	12				190	Malabar S — P = 21 sec.
			eS	7	7	53					Δ = 190.
			F	7	18						
133	" 25	I	i	9	47	55					
			F	9	52						
134	" 26	I	i	10	5	21					
			F	10	9						
135	" 26	I	i	10	9	52					
			F	10	13						
136	" 28	I _r	iP	7	35	5				4510	NE.
			S	7	40	58					Malabar i ₂ — P = 4 ^m 54 sec.
			F	7	48						Δ 5510; NE.
											Taroena, (Sangi I.)
137	" 29	I _r	e	13	12	58				2040	Northern Celebes.
			eS	13	16	20					
			F	13	25						
138	" 31	I	i	8	25	52					
			F	8	36						

AUGUST.

139	Aug. 3	I	P _E	9	51	52				6530?	S disturbed by street traffic.
			S?	9	59,6						
			F	10	5						
140	" 4	II _v	iP	14	34	27				180	± EW.
			iS	14	34	48					Malabar S? — iP = ± 32 sec.
			M	14	55	55	6.0	600	449		Δ = ± 280.
			F	14	56						
141	" 5	I _v	eP	6	48	28				260	Malabar iS — P = 15 sec.
			S _E	6	48	58					Δ = 130.
			F	6	51						Preanger and Banjoemas (Java).
142	" 7	I	e	12	31	44					
			F	12	44						
143	" 7	I	P	21	22	28					
			F	21	24						
144	" 9	I	i	3	57	15					
			i _E	3	11	42					
			F	4	1						
145	" 9	I _r	e _E	6	24	30					Menado and Taroena.
			F	6	32						
146	" 10	I _v	iP _N	11	25	53				200	Malabar iS — iP = 12 sec.
			iS _E	11	24	16					Δ = 100.
			M ₃	11	24	46					Bodjong Asih (Preanger), Java.
			F				in next.				

No.	Date 1922.	Char- acter.	Phase.	Time (Greenwich).			in seconds.	(half)		of epi- centrum.	Remarks.
								A _E	A _N		
				h	m	s		μ	μ		
147	Aug. 10	I _v	P F	11 11	26 28	7					Malabar iS — P = 15 sec. Δ = 110.
148	" 11	I	e F	8 8	42 47	37					
149	" 11	I	e F	13 14	37 4	47 28					
150	" 11	I _r	e _E P i _N S F	19 19 19	45 49 51	17 22				2590	Taroena, Sangi Isles.
151	" 13	I _u	e i ₁ i ₂ i ₃ eL F	0 0 0 0 1 1	22 24 29 32 15 27	25 4 42 47	5.9 18.0				
152	" 14	I	i i _E F	11 12 12	51 0 3	38 11					
153	" 16	I _u	iP iS? i _N i _N eL _E F	16 16 16 16 16 16	8 17 19 20 35 57	1 51 12 32 7	7.0	26.3	17.7	7200?	
154	" 18	I _v	eP F	23 23	33,7 37						Troubled by street traffic. Malabar S? — P = 70 sec. Δ = 650. Pasoeroean and Besoeki, Eastern Java.
155	" 22	I _v	P F	14 14	41 43	10					Malabar iS — iP = 16 sec. Δ = 140. Papandajan Tea Estate (Preanger) Java.
156	" 22	I	P F	20 20	8 15	11					
157	" 22	I	P F	20 20	18 21	22					
158	" 22	I _v	P iS _N F	21 21 21	35 35 40	11 45				300	
159	" 23	I _v	eP S _N M F	0 0 0 0	18 19 19 28	41 20 57	6.6	86.4	23.2	340	
160	" 23	I	e _E i _E F	14 14 14	5 9 15	55 25					
161	" 23	I	i _E F	15 15	21 40	0					



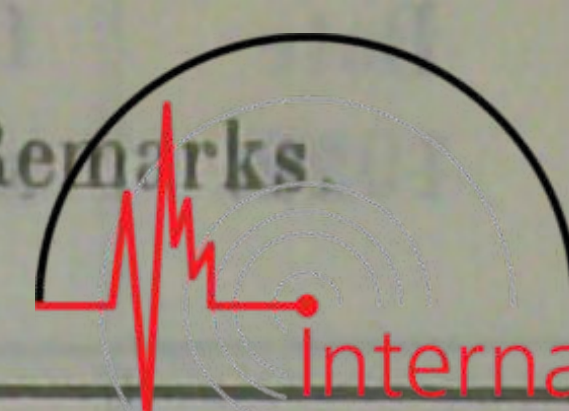
International
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Centre

No.	Date 1922.	Char- acter.	Phase.	Time (Greenwich).			in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
								A _E	A _N		
				h	m	s		μ	μ		
162	Aug. 23	I	iP F	20 20	52 54	22					
165	" 24	I	eL M _E F	20 20 20	0 3 12	25 25	16.0				
164	" 24	I _v	e S F	19 19 19	42 42 47	26 52				230	Batoer (Banjoemas), Java.
165	" 28	I	P F	10 10	46.8 53						troubled by street traffic.
166	" 28	I	i _N F	18 18	14 17	11					
167	" 28	I _v	i _N F	18 18	41 44	4					Margasari (Pekalongan), Java.
168	" 28	I _v	P iS i F	21 21 21 21	47 47 47 56	4 40 45				320	
169	" 28	I	e _E i _N F	22 22 22	6 7 11	40 18					
170	" 29	II _r	P i S M eL F	17 17 17 17 17 17	6 9 10 11 18 47	18 7 40 10	7.2	51.7	124	2820	Malabar iS _N — iP = 4 ^m 21 sec. eL _N — iP = 8,4 ^m Δ = 2850.
171	" 31	I	iP eS iS F	10 10 10 10	52 56 56 54	52 26 59				2620	NE. Malabar S — iP = 4 ^m 7 sec. Δ = 2620. Taroena, Sangi Isles.

SEPTEMBER.

172	Sept. 1	II,	iP i S i eL F	19 19 19 19 19 19	22 24 27 28 35 37	52 11 52 17				5400	NE. Malabar S — P = 5 ^m 17 sec. eL — P = 11 ^m . Δ = 3670.	
173	" 2	I,	P i iS _E F	17 17 17 17	27 28 31 47	42 55 26				2310	Malabar eS — P = 3 ^m 48 sec. Δ = 2360. Menado and Central Celebes.	
174	" 2 " 3	I,	P F	23 3	56 7	36						Central Celebes.
175	" 3	I,	eP iS F	0 0 0	26 26 29	41 56				120	WSW. Malabar iS — P = 18 sec. Δ = 155. Preanger, Java.	

N ^o .	Date 1922.	Char- acter.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
								A _E	A _N		
				h	m	s		μ	μ		
176	Sept. 3	I _v	P iS F	10 10 10	0,0 0 6					± 250	in minute mark. Bantam (Java)
177	" 4	I	iP F	2 2	41 51	46					
178	" 4	I	i _E F	17 17	25 32	9					
179	" 6	I	e F	13 13	45 53	17					
180	" 8	I	i _E i eL F	14 14 14 14	21 28 33 52	39 17					
181	" 9	I _v	P iS F	4 4 4	54 54 58	40 59				160	
182	" 9	II _v	iP iS i _N M F	6 6 6 6 6	7 8 9 9 18	52 15 8 45	5 8	119	178	200	± EW. Malabar S — P = 34 sec. Δ = 300. Parangkoedjang (Bantam), Java.
183	" 9	I _v	e F	13 13	37 38	32 32					Malabar iS — P = 10 sec. Δ = 90. Neglasari (Preanger) Java.
184	" 11	I	e i F	12 13 13	54 2 5	15 37					
185	" 11	II _r	eP iS iS _N M F	14 14 14 14 15	48 48 51 53 15	21 29 29 19 15	6.2	182	400	1780	Malabar S — P = 3 ^m 11 sec. Δ = 1920. Northern Celebes.
186	" 11	I _r	eP i _N i _N F	16 16 16 16	26 30 32 39	59 28 39					Northern Celebes.
187	" 11	I _r	iP i F	18 18 18	51 53 59	43 16					
188	" 14	I	P i ₁ i ₂ i ₃ eL F	19 19 19 19 19 20	38 39 43 44 51 22	22 58 49 30 13					
189	" 16	I	P i L F	22 22 23 23	51 53 6 27	5 33 2					



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No.	Date 1922.	Char- acter.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half).		Distance of epi- centrum									
								Λ_E	Λ_N										
190	Sept. 17	I _a	eP i eL _E F	h 7 7 7 7	m 29 31 45 55	s 34 0		μ	μ										
191	" 17	I	e F	7 8	59 10	38													
192	" 17	I _n	e eL F	10 10 11	6 55 42	3													
193	" 19	I _r	iP S F	18 18 18	29 30 35	41 0				160									
194	" 19	I	i _E i _N F	21 21 22	56 57 10	20 7													
195	" 20	I	e F	5 5	1 7	35													
196	" 21	I _r	P iS F	10 10 10	23 24 30	46 42				500									
197	" 26	I	P _E F	12 12	37 41	33 57													
198	" 28	I	P i F	4 4 4	29 30 37	58 20													

OCTOBER

199	Oct. 1	I _r	iP _E S i F	17 17 17 17	50 34 34 40	41 39 43				2490									
200	" 3	I	P i F	17 17 17	5 5 6	40 43													
201	" 5	I _r	eP i ₁ i ₂ F	5 5 5 5	19 22 22 57	21 7 31 20													
202	" 5	I _r	e F	19 19	51 58	0													
203	" 8	I _r	iP _E iS _N F	17 17 17	26 29 58	57 45				1630									

Malabar S — eP = 4" 0 sec.
 $\Delta = 2520$.

Menado, Halmabeira, Taland I.

Malabar S — eP = 58 sec.
 $\Delta = 2490$.

Malabar iS — iP_E = 2" 42 sec.
 $\Delta = 1580$.

No.	Date 1922.	Char- acter.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
								A _E	A _N		
204	Oct. 9	II _v	P iP S M F	h 8 8 8 8	m 20 20 21 21	s 33 34 34 43		μ	μ	360	S 59.8 E. Malabar S — iP = 31 sec. Δ = 270; S 79.5 E. Preanger — Pasoeroean (Java).
205	" 10	I _v	P _N S _E M F	12 12 12 12	20 21 22 25	47 13 13 13				230	Malabar iS — iP = 13 sec. Δ = 110. Preanger (Java).
206	" 11	I _v	e F	12 12	41 46	35 35					
207	" 11	I _a	i eL _E L eL F	15 15 16 16 16	10 40 4 39 46	14 14 14 14 14					
208	" 14	I	eP F	9 9	3 7	17 17					
209	" 14 " 15		i M F	23 3 3	53 0 28	27 22 22	6.5	38.8	27.2		
210	" 16	I _a	e i L F	16 16 16 16	10 12 28 34	17 8 8 8					
211	" 16	I	i F	16 16	47 51	18 18					
212	" 17	II	P i ₁ i ₂ i ₃ F	6 6 6 6 8	42 49 51 54 8	48 54 28 46 8	8.6	136	104		
213	" 17	I	eP i _E i ₁ i ₂ F	10 10 10 10 10	0 2 6 9 22	50 35 23 16 16					
214	" 17	I	P _N F	18 18	51 7	8 8					
215	" 17	I	P i F	21 21 21	19 25 27	49 12 12					
216	" 19	I _v	P iS F	14 14 14	32 33 39	28 19 19				450	Malabar S _N — P = 41 sec. Δ = 360.
217	" 23	I _v	P F	1 2	59 2	22 22					S troubled by street traffic. Malabar iS — P = 24 sec. Δ = 210. Taradjoe (Preanger) Java.

No.	Date 1922.	Char- acter.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
								A _E	A _N		
218	Oct. 24	II _u	iP ₁ iS eL i F	h 21 21 21 22 22	m 31 34 40 54 1	s 48 48 28 24 17	6.1	39.6	35.3	7280	N 43.9° E. i new shock?
219	" 27	I ₂	P _N i L _E F	14 14 14 14	29 34 46 54	25 49 0 0					
220	" 28	I _v	e F	11 11	49 54	31					Malabar S — P = 5.2 sec. △ = 46; NS. Eastern Preanger (Java).
221	" 28	I _v	e F	19 19	3 5	51					Malabar iS — iP = 12 sec. △ = 100; NS. Eastern Preanger (Java).
NOVEMBER.											
222	Nov. 3	I _r	i _N F	12 13	55 11	7					New Guinea?
223	" 7	I	P _E i F	5 5 5	24 25 37	54 50 0					
224	" 7	I	P _E M F	9 9 9	30 32 37	18 18 0	5.0	51.1	15.7		
225	" 7	I	e eL F	17 17 17	8 17 34	16					
226	" 7	I	e F	17 17	40 52	1					
227	" 7	II _v	P _E i _N i _N M F	18 18 18 18 18	18 20 21 22 57	20 38 12 23 0	5.8	118	99.3		Malabar iS _E — P = 1 ^m 4 ^s sec. △ = 950.
228	" 7	I _v	iP iS F	22 22 22	43 43 47	2				150	Bantam and Preanger, (Java).
229	" 7	I	i F	23 23	19 27	57					
230	" 9	I _v	eP F	21 21	50 55	43					Malabar iS — P = 33 sec. △ = 290. Preanger.
231	" 10	I	e F	12 12	38 45	28					
232	" 25	III _v	i ₁ i ₂ i ₃ i _N	4 4 4 5	52 52 59 8	14 25 46 54	7.3	35.9	59.9		Azimuth S 59 E. Malabar i ₁ 4 ^h 52 ^m 14 sec. i _N 5 58 8 i _E 5 14 55

No.	Date 1922.	Char- acter.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
								A _E	A _N		
				h 5 5 5 5 6 6 7	m 21 27 35 45 1 41 31	s 19 16 5 53 49 28 24 31		μ 3116 1024 1247 483 332 259	μ 1365 1065 2360 432 152 207		
233	Nov. 11	I	i	7	2	43					Malabar L _E 5 ^h 24 ^m 55 sec. L 5 46 ^m 9 sec.
234	" 11	I	iP i F	7 7 7	46 47 55	23 26 0					
235	" 11	I _v	iP iS i F	17 17 17 17	18 43 19 25	13 38 7 0				220	± NS. Malabar iS — iP = 14 sec. △ = 120. Preanger.
236	" 11	I	P F	18 18	29 47	14					± NS.
237	" 16	I _r	e i F	4 4 4	50 34 39	22 48 0					Menado.
238	" 16	I _v	eP F	15 15	41 44	55 0					Malabar iS — iP = 21 sec. △ = 180. Preanger.
239	" 16	I	P i F	22 22 22	25 26 33	0 0 0					
240	" 17	I _u	i _N i i _N eL eL F	11 11 11 12 12 12	22 25 25 16 35 47	26 1 33 13 5 0	34.5 36.5				Malabar i 11 ^h 22 ^m 46 sec.
241	" 18	I _v	P _N iS F	2 2 2	12 12 14	19 40 21				180	Malabar iS — iP = 12 sec. △ = 100. Preanger.
242	" 19	I	i F	7 7	45 49	28					troubled by street traffic.
243	" 21	I	P M F	0 0 0	25 28 36	52 57 0	6.0	26.3	32.3		Malabar i — P = 31.6 sec.
244	" 22	II	iP i M F	5 5 5 6	55 55 59 10	0 38 9 0	5.8	81.3	105		NNE.
245	" 26	I	i F	15 15	49 56	35					
246	" 27	I _v	P S F	10 10 10	34 34 39	29 52 0				200	

N ^o .	Date 1922.	Char- acter.	Phase.	Time (Greenwich).	Period in seconds.		Amplitude (half).		Distance of epi- centrum.	Remarks.
					A _E	A _N	μ	μ		
247	Nov. 29	I	e i ₁ i ₂ F	h m s						
				16 42 47						
				16 44 38						
				16 48 12						
				16 51						
DECEMBER.										
248	Dec. 1	I	i ₁ i ₂ i _E F	25 33 51						
				25 35 26						
				25 40 11						
				0 7						
249	" 2	I _u	P L _E F	3 53 21						
				4 12 25						
				4 22						
250	" 2	I _v	P i F	18 28.1						
				18 28 56						
				18 42						
251	" 4	I _r	e _E i ₄ i ₂ F	22 53 26						
				22 57 8						
				23 0 23						
				23 6						
252	" 6	I _v	eP iS M F	13 44 48				170		Malabar iS — iP = 12 sec.
				13 45 8						Δ = 100; WSW.
				13 46 12	5.7					
				13 48						Preanger (Java).
253	" 6	II	P _N i M F	14 4 56						
				14 13 33						
				14 15 20	5.8	128	45.4			
				14 42						
254	" 7	I _u	iP iS L _E F	16 58 24				5000		
				17 5 3						
				17 20 0						
				17 37						
255	" 8	I _v	e F	22 43 5						
				22 59						
256	" 8	I	e F	23 34 51						
				23 47						
257	" 11	II _a	iP iS i M F	11 49 58				160		Malabar iS — iP _E = 26 sec.
				11 50 17						Δ = 230.
				11 50 45						
				11 51 2						West Java.
258	" 11	I _v	iP iS F	12 12						
259	" 12	I _r	e F	17 2 0				180		WSW.
				17 13						Malabar S — P _E = 21 sec.
										Δ = 180.
										Moentjang (Bantam), Java.
										Menado.

N ^o .	Date 1922.	Char- acter.	Phase.	Time (Greenwich).	Period in second.	Amplitude half.		Distance of epi- centrum.	Remarks.
						A _E	A _N		
260	Dec. 13	I _v	i _E i iS _N F	h m s					
				16 38 41					
				16 38 59					
				16 39 56					
				16 46 38					
261	" 14	I	e i F	22 49.4					
				23 14 12					
				23 52					
262	" 16	I	i F	10 54 31					
				10 58					
263	" 17	I	e _E i _E F	1 1 9					
				1 10 55					
				1 20					
264	" 17	I	eP i ₁ i ₂ F	4 42 12					
				4 43 17					
				4 43 59					
				4 54					
265	" 17	I	e i F	12 5 33					
				12 5 45					
				12 9					
266	" 17	II	i _N i ₁ i ₂ M F	14 5 36					
				14 4 12					
				14 5 8					
				14 5 38					
267	" 18	I _v	eP e F	14 24					
				25 23 56					
				25 29 27					
				23 35					
268	" 19	I _v	e F	8 46 7					
				8 48					
269	" 21	I	e _E i ₁ i ₂ F	11 19 40					
				11 20 35					
				11 21 38					
				11 27					
270	" 23	III _v	iP iS _E M ₁ M ₂ F	17 11 25					
				17 12 10					
				17 12 55					
				17 13 56					
271	" 23	I _v	P M ₁ M ₂ F	in next.					
				17 30 5					
				17 31 57					
				17 32 48					
272	" 23	I _v	iP F	17 40					
				19 1 33					
				19 14					
273	" 23	I _v	i F	23 21 17					
				23 24					
274	" 23	I _v	i F	23 56 37					
				0 5					

No.	Date 1922.	Char- acter.	Phase.	Time (Greenwich).			Period in second.	Amplitude (half).		Distance op epi- centrum.	Remarks.		
								A _E	A _N				
275	Dec. 23	I	e ₁	h	m	s		μ	μ				
			e ₂	22	7	38							
			F	22	16	38							
276	" 24	I	e	0	17	40							
			i	0	22	5							
			F	0	37								
277	" 25	I _u	i _N	3	44	20	18.5						
			i _E	3	53	15							
			L	3	54	9							
278	" 25	I	F	4	9	15							
				4	54								
279	" 26	I _v	e	11	30	25							
			i _E	11	31	47							
			F	11	42								
280	" 31	I _u	iP	9	24	58	6.0			160	Malabar iS — P = 14 sec Δ = 120. Bantam and Preanger (Java).		
			iS	9	24	56							
			F	9	28								
281	" 13	I	i ₁	7	30	45	12.5						
			i ₂	7	33	h							
			i ₃	7	34	28							
282	" 13	I	i ₄	7	39	26							
			eL _E	7	37	19							
			M	8	8	19							
283	" 13	I	F	8	27								
284	" 13	I	i _E	11	46	37							
			i	11	52	44							
			F	11	58								

CONSTANTS

1922.	EW Component.			NS Component.		
	V	T ₀	ε	V	T ₀	ε
January	214	6.8	4.1	195	7.0	4.0
February	"	6.6	4.2	"	"	4.2
March	"	6.7	4.6	"	"	4.1
April	"	6.8	4.5	"	"	"
May	"	6.6	3.9	"	"	"
June	190	7.4	2.8	188	7.6	"
July	"	8.0	4.6	"	8.0	3.1
August	"	"	4.3	"	"	"
September	"	7.8	4.1	"	"	3.0
October	"	7.9	4.2	"	8.1	3.1
November	"	8.0	4.4	"	8.0	3.3
December	"	7.8	3.9	"	"	3.7

ERRATA: 1922, N° 102, May 21; read: eP 5^h 15,1^m; iS 5^h 19^m 6 s.