

SEISMOLOGICAL BULLETIN.

JANUARY 1920.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.

Greenwich Mean 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 1920.	Character.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
						A _E	A _N		
1	Jan. 1	I _u	e	12 16 50	1.92	μ	μ	9200?	E — W.
			M	12 18 15					
			eS?	12 26 44					
			M	12 28 9					
			L ₁	12 49.2					
			L ₂	12 55.2					
			L ₃	12 59.2					
2	» 2	I _r	e	16 47 50	1.92	μ	μ	9200?	Felt on the Isle of Kisar (Timor).
			F	16 50					
3	» 6	I _v	e	5 43 25	0.74	0.01	0.01	9200?	Felt on the West Coast of Sumatra.
			M	5 46 25					
			F	5 50					
4	» 8	I _v	e	9 4 18	0.74	0.01	0.01	9200?	Felt on the West Coast of Sumatra.
			S	9 4 59					
			F	9 7					
5	» 10	I	e	1 30 14	0.74	0.01	0.01	9200?	Felt in Benkoelen, Sumatra.
			eM	1 32 1					
			F	1 34					
6	» 10	I _v	i	18 30 16	0.74	0.01	0.01	9200?	Felt in the resid. of Kedoe and Banjoemas, Java.
			M	18 31 52					
			F	18 56					
7	» 12	I _r	eP	2 59 57	0.74	0.01	0.01	9200?	Felt in SE-Borneo.
			M	3 2 44					
			eS	3 5 20					
			M	3 6 21					
8	» 12	I _r	eP	12 32 20	0.74	0.01	0.01	9200?	Felt in SE-Borneo.
			eM	12 33 57					
			F	12 42					
9	» 12	I _r	P	13 48 29	6.0	11.5	—	4990	E — W.
			iS	13 55 11					
			M ₁	13 55 36					
			M ₂	13 58 59					
			F	14 13					
10	» 12	I	e	14 44 28	6.0	27.0	24.5	4990	Felt at Padang, Sumatra.
			M	14 45 54					
			F	14 53					

SEISMOLOGICAL BULLETIN 1920.

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), 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 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 through a drop of mercury.

For each month the mean constants for that month are applied. T_o 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 from 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

$$(a) = 1.407 \text{ millimeters.}$$

$$(b) = 1225 \text{ "}$$

$$(c) = 895 \text{ "}$$

The constants used in 1919 are given below.

1919.	E-W component.			N-S component.		
	V.	T_o .	ϵ .	V.	T_o .	ϵ .
January 1—12.....	218	6.6	4.4	195	6.6	5.0
,, 13—31.....	228	8.0	4.5	192	8.0	4.5
February.....	"	7.8	3.8	"	"	"
March.....	"	"	4.7	"	"	4.9
April.....	"	"	5.0	"	"	4.7
May.....	"	7.9	4.2	"	7.8	4.2
June.....	"	7.6	4.9	"	7.6	5.4
July.....	"	"	4.8	"	"	5.4
August.....	"	"	5.2	"	"	5.1
September.....	216	"	5.1	193	"	4.9
October.....	"	7.5	4.7	"	"	5.2
November.....	"	7.6	4.8	"	8.2	6.0
December.....	"	"	4.9	"	7.9	4.5

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.

MALABAR.

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

Particulars about the registrations have been put under the remarks.

0.1	0.8	201	0.1	0.8	801	0.1	0.8	101	0.1	0.8	1201	0.1	0.8	1401	0.1	0.8	1601	0.1	0.8	1801	0.1	0.8	2001	0.1	0.8	2201	0.1	0.8	2401	0.1	0.8	2601	0.1	0.8	2801	0.1	0.8	3001	0.1	0.8	3201	0.1	0.8	3401	0.1	0.8	3601	0.1	0.8	3801	0.1	0.8	4001	0.1	0.8	4201	0.1	0.8	4401	0.1	0.8	4601	0.1	0.8	4801	0.1	0.8	5001	0.1	0.8	5201	0.1	0.8	5401	0.1	0.8	5601	0.1	0.8	5801	0.1	0.8	6001	0.1	0.8	6201	0.1	0.8	6401	0.1	0.8	6601	0.1	0.8	6801	0.1	0.8	7001	0.1	0.8	7201	0.1	0.8	7401	0.1	0.8	7601	0.1	0.8	7801	0.1	0.8	8001	0.1	0.8	8201	0.1	0.8	8401	0.1	0.8	8601	0.1	0.8	8801	0.1	0.8	9001	0.1	0.8	9201	0.1	0.8	9401	0.1	0.8	9601	0.1	0.8	9801	0.1	0.8	10001	0.1	0.8	10201	0.1	0.8	10401	0.1	0.8	10601	0.1	0.8	10801	0.1	0.8	11001	0.1	0.8	11201	0.1	0.8	11401	0.1	0.8	11601	0.1	0.8	11801	0.1	0.8	12001	0.1	0.8	12201	0.1	0.8	12401	0.1	0.8	12601	0.1	0.8	12801	0.1	0.8	13001	0.1	0.8	13201	0.1	0.8	13401	0.1	0.8	13601	0.1	0.8	13801	0.1	0.8	14001	0.1	0.8	14201	0.1	0.8	14401	0.1	0.8	14601	0.1	0.8	14801	0.1	0.8	15001	0.1	0.8	15201	0.1	0.8	15401	0.1	0.8	15601	0.1	0.8	15801	0.1	0.8	16001	0.1	0.8	16201	0.1	0.8	16401	0.1	0.8	16601	0.1	0.8	16801	0.1	0.8	17001	0.1	0.8	17201	0.1	0.8	17401	0.1	0.8	17601	0.1	0.8	17801	0.1	0.8	18001	0.1	0.8	18201	0.1	0.8	18401	0.1	0.8	18601	0.1	0.8	18801	0.1	0.8	19001	0.1	0.8	19201	0.1	0.8	19401	0.1	0.8	19601	0.1	0.8	19801	0.1	0.8	20001	0.1	0.8	20201	0.1	0.8	20401	0.1	0.8	20601	0.1	0.8	20801	0.1	0.8	21001	0.1	0.8	21201	0.1	0.8	21401	0.1	0.8	21601	0.1	0.8	21801	0.1	0.8	22001	0.1	0.8	22201	0.1	0.8	22401	0.1	0.8	22601	0.1	0.8	22801	0.1	0.8	23001	0.1	0.8	23201	0.1	0.8	23401	0.1	0.8	23601	0.1	0.8	23801	0.1	0.8	24001	0.1	0.8	24201	0.1	0.8	24401	0.1	0.8	24601	0.1	0.8	24801	0.1	0.8	25001	0.1	0.8	25201	0.1	0.8	25401	0.1	0.8	25601	0.1	0.8	25801	0.1	0.8	26001	0.1	0.8	26201	0.1	0.8	26401	0.1	0.8	26601	0.1	0.8	26801	0.1	0.8	27001	0.1	0.8	27201	0.1	0.8	27401	0.1	0.8	27601	0.1	0.8	27801	0.1	0.8	28001	0.1	0.8	28201	0.1	0.8	28401	0.1	0.8	28601	0.1	0.8	28801	0.1	0.8	29001	0.1	0.8	29201	0.1	0.8	29401	0.1	0.8	29601	0.1	0.8	29801	0.1	0.8	30001	0.1	0.8	30201	0.1	0.8	30401	0.1	0.8	30601	0.1	0.8	30801	0.1	0.8	31001	0.1	0.8	31201	0.1	0.8	31401	0.1	0.8	31601	0.1	0.8	31801	0.1	0.8	32001	0.1	0.8	32201	0.1	0.8	32401	0.1	0.8	32601	0.1	0.8	32801	0.1	0.8	33001	0.1	0.8	33201	0.1	0.8	33401	0.1	0.8	33601	0.1	0.8	33801	0.1	0.8	34001	0.1	0.8	34201	0.1	0.8	34401	0.1	0.8	34601	0.1	0.8	34801	0.1	0.8	35001	0.1	0.8	35201	0.1	0.8	35401	0.1	0.8	35601	0.1	0.8	35801	0.1	0.8	36001	0.1	0.8	36201	0.1	0.8	36401	0.1	0.8	36601	0.1	0.8	36801	0.1	0.8	37001	0.1	0.8	37201	0.1	0.8	37401	0.1	0.8	37601	0.1	0.8	37801	0.1	0.8	38001	0.1	0.8	38201	0.1	0.8	38401	0.1	0.8	38601	0.1	0.8	38801	0.1	0.8	39001	0.1	0.8	39201	0.1	0.8	39401	0.1	0.8	39601	0.1	0.8	39801	0.1	0.8	40001	0.1	0.8	40201	0.1	0.8	40401	0.1	0.8	40601	0.1	0.8	40801	0.1	0.8	41001	0.1	0.8	41201	0.1	0.8	41401	0.1	0.8	41601	0.1	0.8	41801	0.1	0.8	42001	0.1	0.8	42201	0.1	0.8	42401	0.1	0.8	42601	0.1	0.8	42801	0.1	0.8	43001	0.1	0.8	43201	0.1	0.8	43401	0.1	0.8	43601	0.1	0.8	43801	0.1	0.8	44001	0.1	0.8	44201	0.1	0.8	44401	0.1	0.8	44601	0.1	0.8	44801	0.1	0.8	45001	0.1	0.8	45201	0.1	0.8	45401	0.1	0.8	45601	0.1	0.8	45801	0.1	0.8	46001	0.1	0.8	46201	0.1	0.8	46401	0.1	0.8	46601	0.1	0.8	46801	0.1	0.8	47001	0.1	0.8	47201	0.1	0.8	47401	0.1	0.8	47601	0.1	0.8	47801	0.1	0.8	48001	0.1	0.8	48201	0.1	0.8	48401	0.1	0.8	48601	0.1	0.8	48801	0.1	0.8	49001	0.1	0.8	49201	0.1	0.8	49401	0.1	0.8	49601	0.1	0.8	49801	0.1	0.8	50001	0.1	0.8	50201	0.1	0.8	50401	0.1	0.8	50601	0.1	0.8	50801	0.1	0.8	51001	0.1	0.8	51201	0.1	0.8	51401	0.1	0.8	51601	0.1	0.8	51801	0.1	0.8	52001	0.1	0.8	52201	0.1	0.8	52401	0.1	0.8	52601	0.1	0.8	52801	0.1	0.8	53001	0.1	0.8	53201	0.1	0.8	53401	0.1	0.8	53601	0.1	0.8	53801	0.1	0.8	54001	0.1	0.8	54201	0.1	0.8	54401	0.1	0.8	54601	0.1	0.8	54801	0.1	0.8	55001	0.1	0.8	55201	0.1	0.8	55401	0.1	0.8	55601	0.1	0.8	55801	0.1	0.8	56001	0.1	0.8	56201	0.1	0.8	56401	0.1	0.8	56601	0.1	0.8	56801	0.1	0.8	57001	0.1	0.8	57201	0.1	0.8	57401	0.1	0.8	57601	0.1	0.8	57801	0.1	0.8	58001	0.1	0.8	58201	0.1	0.8	58401	0.1	0.8	58601	0.1	0.8	58801	0.1	0.8	59001	0.1	0.8	59201	0.1	0.8	59401	0.1	0.8	59601	0.1	0.8	59801	0.1	0.8	60001	0.1	0.8	60201	0.1	0.8	60401	0.1	0.8	60601	0.1	0.8	60801	0.1	0.8	61001	0.1	0.8	61201	0.1	0.8	61401	0.1	0.8	61601	0.1	0.8	61801	0.1	0.8	62001	0.1	0.8	62201	0.1	0.8	62401	0.1	0.8	62601	0.1	0.8	62801	0.1	0.8	63001	0.1	0.8	63201	0.1	0.8	63401	0.1	0.8	63601	0.1	0.8	63801	0.1	0.8	64001	0.1	0.8	64201	0.1	0.8	64401	0.1	0.8	64601	0.1	0.8	64801	0.1	0.8	65001	0.1	0.8	65201	0.1	0.8	65401	0.1	0.8	65601	0.1	0.8	65801	0.1	0.8	66001	0.1	0.8	66201	0.1	0.8	66401	0.1	0.8	66601	0.1	0.8	66801	0.1	0.8	67001	0.1	0.8	67201	0.1	0.8	67401	0.1	0.8	67601	0.1	0.8	67801	0.1	0.8	68001	0.1	0.8	68201	0.1	0.8	68401	0.1	0.8	68601	0.1	0.8	68801	0.1	0.8	69001	0.1	0.8	69201	0.1	0.8	69401	0.1	0.8	69601	0.1	0.8	69801	0.1	0.8	70001	0.1	0.8	70201	0.1	0.8	70401	0.1	0.8	70601	0.1	0.8	70801	0.1	0.8	71001	0.1	0.8	71201	0.1	0.8	71401	0.1	0.8	71601	0.1	0.8	71801	0.1	0.8	72001	0.1	0.8	72201	0.1	0.8	72401	0.1	0.8	72601	0.1	0.8	72801	0.1	0.8	73001	0.1	0.8	73201	0.1	0.8	73401	0.1	0.8	73601	0.1	0.8	73801	0.1	0.8	74001	0.1	0.8	74201	0.1	0.8	74401	0.1

SEISMOLOGICAL BULLETIN

FEBRUARY 1920.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.

Greenwich Mean 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 1920.	Char- acter.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
						A _E	A _N		
24	Febr. 1	I _r	iP	h m s		μ	μ	5950	Malabar P — S = 5 ^m 56 sec. △ = 3800.
			M ₁	13 33 11					
			M ₂	13 34 40					
			S	13 36 54					
			M ₃	13 38 54					
			M ₄	13 40 33	5.7	51.4	65.5		
			F	13 42 7	5.5	45.8	19.9		
25	» 1	I _r	iP	17 55 40				3550	No reliable records.
			S=M	18 0 59					
			F	18 4					
26	» 2	III _s	P	11 30 38				5320?	E — W. Malabar e — S = 6 ^m 59 sec. △ = 4930.
			i	11 31 30					
			M	11 32 24	6.0	158.8	107.2		
			S?	11 37 59					
			eL	11 42 12					
			M ₁	11 45 43	55.2	5510	5560		
			M ₂	11 51 30	51.0	6070	4650		
			M ₃	11 58 16	51.0	7140	5350		
			F	13 58					
27	» 2	I _v	e	15 48 18				Malabar iP — S = 11 sec. △ = 94	Felt in Prianger and Banjoeemas, Java.
			M ₁	15 48 50					
			M ₂	15 49 51					
			F	15 55					
28	» 2	I	e ₁	16 53					
			e ₂	16 59					
			F	17 12					
29	» 2	I	e	18 56					
			F	19 0					
30	» 3	I _v	e	11 19 27				240	E — W.
			iS=M	11 19 54					
			eL	11 20 29					
			F	11 24					
31	» 3	I	e	15 1 28					
			M	15 9 56					
			F	15 18					
32	» 3	II _r	P	18 57 25				2490	
			iS=M	19 1 29					
			P	19 11					

No.	Date 1920.	Character.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)	Distance of epi- centrum.	Remarks.	
								A _E	A _N
33	Febr. 4	I	e	h m s		μ	μ		
			M	12 52					
			F	12 57					
				13 4					
34	" 6	I	e	5 12 6				Malabar e — iS = 20 sec. Δ = 180 KM.	
			F	5 16					
35	" 7	I	e ₁	15 16 8				Felt in Banjoemas and Preanger, Java.	
			e ₂	15 25 3					
			e ₃	15 32 42					
36	" 8	I _r	e ₄	15 39 48					
			F	16 10 7					
			P	5 30 33					
37	" 8	I _v	M ₁	5 32 26				Malabar i — S = 9 sec. Δ = 78; WSW.	
			M ₂	5 36 56					
			eL	5 42 24					
38	" 9	I _r	F	6 53				Felt in the Preanger, Java.	
			S	7 2 24					
			M	7 2 46					
39	" 9	I _r	F	7 4 01					
			S	7 9					
			F	19 17 8					
40	" 10	I	e	19 23 18					
			M	19 34					
			F	19 40					
41	" 10	I	e	10 11					
			M	10 23					
			F	10 27					
42	" 10	I _v	e	22 27					
			M ₁	22 36 5					
			M ₂	22 44 1					
43	" 11	I _r	M ₃	22 52					
			eL ₁	23 39					
			M	23 44 43					
44	" 12	II _v	eL ₂	23 59					
			F	0 7					
45	" 12	II _v	i	10 34 53				E — W.	
			S	10 35 49					
			M	10 37 17	6.7	146.0	165.0		
46	" 14	I _r	F	10 47					
			e	12 14 48					
			S	12 15 7					
47	" 14	I _r	F	12 18				Malabar iP — S = 15 sec. Δ = 130.	
			e	13 48 19					
			F	13 52					
48	" 16	I	e	9 57 9					
			F	10 1					

No.	Date 1920.	Character.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)	Distance of epi- centrum.	Remarks.	
								A _E	A _N
47	Febr. 18	I _v	e	h m s		μ	μ	Malabar P — S = 29 sec. Δ = 260.	
			M	25 17 22					
			F	23 18 26					
48	" 19	I	e	12 40 57					
			F	12 45					
49	" 20	I _u	e	11 56 31				8460	
			S	12 6 4					
			M	12 7 47					
50	" 22	I _u	F	12 12				6570 SW — NE.	
			iP	17 45 45					
			iS = M ₁	17 53 49					
51	" 25	II _r	M ₂	17 57 7				2650 ENE.	
			F	18 2					
52	" 26	III _r	iP ₁	1 28 56				1160 No minute marks. ENE	
			P ₂	1 29 26					
			S ₁	1 30 40					
53	" 26	I	eS ₂	1 31 52				1180 Malabar record very uncertain. Felt in SE Borneo.	
			M	1 52 7					
			F	2 27					
54	" 29	I	eP	18 13 32				1120 Computed epicentrum 2,1° S; 116,5 E.	
			S	18 15 32					

No.	Date 1920.	Character.	Phase	Time (Greenwich).			Period in seconds.	Amplitude (half)	Distance of epi- centrum	Remarks.
				A _E	A _N	μ				
65	March 17	II _r	eP	18	40	17				2320?
			S?	18	44	8				Malabar very faint. Felt in Northern Sumatra.
			M ₁	18	45	50				
			M ₂	18	48	38	6.0	84.0	44.0	
			eL	18	56					
			F	19	27					
66	» 17	I _r	P	22	54	8				2710
			iS	22	58	36				Malabar P — iS = 265 sec. △ = 2770.
			F	23	5					
67	» 18	II _v	eP	1	25	5				220
			iS	1	25	30				Malabar iP — iS = 18 sec △ = 160.
			M ₁	1	25	41				Felt in Central Java.
			M ₂	1	26	44				
			F	1	37					
68	» 18	I _r	e	7	39	20				250?
			S?	7	39	46				Malabar iP — S = 20 sec. △ = 180.
			M	7	40	52				
			F	7	44					
69	» 20	III _v	iP	1	5	21				200
			iS	1	5	44				E — W. Malabar faint.
			M	1	5	56	5.8	382.7	444.0	
			F	1	13					
70	» 20	II _v	e	14	25	3	47			Malabar faint.
			F	14	7					Felt in Bantam and the Pre- anger, Java.
71	» 20	II _v	iP	14	14	44				150
			iS = M	14	15	1				E — W. Malabar iP — S = 26 sec.
			F	14	25					△ = 250. Felt at Lebak Parai (Bantam), Java.
72	» 20	I _v	e _E	18	52	16				
			M	18	55	28				
			i	18	59	24				
			M ₁	19	0	28	6.2	55.8	53.2	
			M ₂	19	2	46				
			M ₃	19	18	44				
			L ₁	19	51	16				
			ML ₁	19	43	24	18.0	45	51	
			L ₂	19	48	52		45	51	
			L ₃	20	1	24		45	51	
			F	20	37			45	51	
73	» 22	I _r	e	3	22	24				1090
			S	3	24	21				
			F	3	28					
74	» 22	I _r	iP	4	45	6				Malabar faint.
			F	4	45	56				
75	» 22	I _r	e	7	25	7				1110
			eS	7	27	6				SE-Borneo.
			M	7	28	58				
			F	8	4					

No.	Date 1919.	Character.	Phase	Time (Greenwich).			Period in seconds.	Amplitude (half)	Distance of epi- centrum	Remarks.
				A _E	A _N	μ				
76	March 22	I	P	20	15	0				
			M _N	20	18	45				
			M	20	22	26				
			M	20	25	18				
			eL	20	43	14				
			F	20	50					
77	» 25	I _v	eP	21	52	5				950
			eS	21	53	45				Malabar eP — eS = 67 sec. △ = 610.
			M	21	54	50				Felt in Eastern Java.
			F	21	7					
78	» 28	I _r	eP	0	57	57				1060
			i	0	58	28				1100?
			eS	0	59	31				
			i	1	0	26				
			M	1	1	55				
			F	1	18					

SEISMOLOGICAL BULLETIN.

APRIL 1920.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.

Greenwich Mean Time.

S. Latitude $6^{\circ} 11' 0''$. Height above sealevel

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

WIECHERT Horizontal Pendulum, 1000 kilograms.

The symbols are according to WIECHERT.

No.	Date 1920.	Char- acter.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
						A _E	A _N		
79	April 2	I _r	P	h m s		μ	μ	1050	E — W.
			S	1 14 18					
			M ₁	1 14 20	6.1	22.5	10.7		
			M ₂	1 17 7	5.9	21.2	11.6		
			F	1 37					
80	" 4	I	eP	17 4 23				880	SE-Borneo.
			M	17 6 2					
			F						
81	" 5	I _r	e	15 58 43				1000	E — W.
			eS	16 0 31					
			F	16 12					
82	" 5	I	e	16 40 45				880	E — W.
			F	16 42					
83	" 6	I _u	P	19 10 50				5030	E — W.
			M	19 11 59					
			S	19 17 35					
			eL _E	19 25					
			F	19 37					
84	" 7	I _v	eP	17 31 9				190	Malabar P — iS = 11 sec. Δ = 100. Felt in the Preanger, Java.
			S	17 31 50					
			F	17 34					
85	" 9	I _v	e	19 11 50				920	E — W. SE-Borneo
			S	19 13 29					
			F	19 17					
86	" 11	I _u	eP	23 14 41				6700	
			eS	23 22 52					
			M	23 23 54	7.0	49.9	6.1		
			eL	23 28					
			F	23 48					
87	" 17	I	e	5 24 39					Probably felt in Benkoelen, Sumatra.
			F	5 30					
88	" 18	I _v	P	8 45 6				190	Felt in Benkoelen, Sumatra.
			S	8 45 28					
			M	8 47 13					
			F	8 55					

No.	Date 1920.	Character.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
						A _E	A _N		
89	April 19	I _v	P iS=M F	h m s 5 24,5 5 24 37 in next		μ μ		± 190	P begins in minute mark. Azimuth S 34, 5 W. Malabar iP — iS = ± 22 sec. (iS in minute mark) $\Delta = \pm 190$. Felt in the Preanger and Bantam, Java.
90	" 19	I _v	P iS F	5 34,5 5 55,2 5 39				± 570	disturbed by 89. Malabar P — S = 25 sec. $\Delta = 200$.
91	" 19	II _v	P iS F	5 56,5 5 56 37 4 12				± 190	P begins in minute mark. Azimuth S 34,5 W. Malabar P — S = 20 sec. $\Delta = 180$. Felt in the Preanger and Bantam, Java.
92	" 19	I	i F	14 58 54 15 1					
93	" 19	II _v	P S? M F	17 47 5 17 48 22 17 48 54 18 1				710?	E — W. Malabar faint.
94	" 19	I	e M F	21 25 56 21 28 56 21 37					
95	" 21	I _r	eP iS F	21 5 51 21 5 48 21 11				1090	Malabar eP — eS = 107 sec. $\Delta = 990$.
96	" 23	I	i F	13 52 0 13 55					
97	" 25	I _r	P i M ₁ M ₂ M ₃ F	16 50 56 16 51 20 16 55 57 16 56 49 16 59 6 17 7	6.0 5.9	17.8 50.5	42.5 24.5		Malabar eP — S = 5 ^m 54 sec. $\Delta = 2360$. Felt in the Isle of Jamdena, Tanimbar Isles, Moluccas.
98	" 29	I	i F	6 56 5 6 39					
99	" 29	I	P F	16 18 59 16 52					
100	" 30	I _v	e M F	5 55 12 5 57 50 6 1					Malabar P — iS = 17 sec. $\Delta = 150$. Felt at Tjikadjang (Preanger), Java.

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SEISMOLOGICAL BULLETIN.

MAY 1920.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.

Greenwich Mean 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 1920.	Char- acter.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
						A _P	A _N		
101	May 2	I	e	h m s					
			e	8 45 30					
			e	8 49 56					
			M	8 51 32					
			eL	8 52 56					
102	* 2	I	F	9 2					
			e	15 6 2					
			e	15 9 56					
			eL	15 12 2					
103	* 2	I,	F	15 18					
			e	18 45 56					
			F	18 47					
104	* 5	I,	e	5 18 18					
			S	5 18 34					
			M	5 19 40					
			F	5 22					
								110	
105	* 5	I	e	8 45 49					
			e	8 48 58					
			M ₁	8 53 49					
			M ₂	8 55 17					
			F	8 59					
						5.8	24.4	8.2	
106	* 6	I	e	9 49 1					
			S	9 55 54					
			M ₁	9 56 6					
			M ₂	9 57 46					
			F	10 13 18					
107	* 7	III,	iP	5 46 2					
			S	5 50 14					
			M ₁	5 50 27					
			M ₂	5 53 11					
			eL	6 1 17					
			F	6 41 17					
108	* 7	II	P	21 40 2					
			i	21 42 23					
			i	21 44 52					
			i _s	21 47 14					
			i _e	21 48 54					
			eL	21 52 33					
			F	23 7					

Nº.	Date 1920.	Character.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)		Distance of epi- centrum	Remarks.
						A _P	A _S		
109	May 9	I	P	h m s		P	P		
			M	17 20 54					
			F	17 26 58					
110	* 10	III _r	P	18 54 22		2770?	E — W; two shocks? Malabar P — eS = 224 sec. $\Delta = 2240$. Felt in the Moluccas and Western N. Guinea.		
			iP	18 55 11					
			iS	18 59 36					
			M	19 0 7					
			eL	19 11					
			F	19 52					
111	* 12	I	i	22 9 1		910?	E — W.		
			F	22 11 43					
112	* 13	II	P	1 55 54		2440			
			M ₁	1 57 56					
			M ₂	1 58 55					
			M ₃	1 59 19					
			M ₄	2 0 8					
			eL	2 10					
			F	3 9					
113	* 13	I _r	P	8 56 11		910?	E — W. Felt in Benkoelen, Sumatra.		
			eS?	8 57 49					
			M	8 39 9					
			F	8 42 17					
114	* 16	I _r	P	21 15 56		2440			
			iS	21 19 56					
			M	21 24 18					
			F	21 28 29					
115	* 19	II _r	iP	5 14 24		1850?	NE. Malabar faint. Felt in Menado, Banggai Isles and Halmahera.		
			S?	5 17 51					
			M ₁	5 19 2					
			M ₂	5 20 58					
			F	5 42					
116	* 19	I	e	4 4 15		2410?	Felt on the whole isle of Celebes.		
			M ₁	4 5 54					
			M ₂	4 9 2					
			F	4 17					
117	* 19	II _r	P	12 45 56		2410?	Felt on the whole isle of Celebes.		
			i	12 46 49					
			i	12 49 0					
			iS?	12 49 54					
			M ₁	12 50 48					
			M ₂	12 51 49					
			M ₃	12 55 15					
			M ₄	12 54 56					
			M ₅	12 56 52					
			F	13 15					
118	* 20	I	P	0 45 52		180			
			S	0 46 15					
			F	0 50					
119	* 20	II _r	iP	7 56 0		6550	ENE.		
			i	7 59 42					
			S	7 44 2					
			eL	7 54 42					
			F	8 12 42					

No.	Date 1919.	Character.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
						A _E	A _S		
120	May 22	I.	P	h m s		μ	μ	200	Malabar P — eS = 29 sec. $\Delta = 260.$
			S	18 19 56					
			F	18 20 19					
121	* 23	I	e	20 21					No minute marks.
			F	20 35					
122	* 23	II	P	13 27 57		5.2	137 89.1		E — W. Malabar faint.
			i	13 28 16					
			M	13 30 15					
			F	13 59					
123	* 26	I _s	iP	12 55 8				7700	E — W.
			iS	12 44 7					
			F	12 52					
124	* 26	I	e	22 50 11					Malabar P — iS = 12 sec. $\Delta = 100.$ Felt in the Preanger, Java.
			M	22 51 36					
			F	22 55					
125	* 27	III.	iP	5 50 1		5.8	461 457	730	ESE. Malabar P — iS = 80 sec. $\Delta = 750.$ Felt as weak or moderate shocks from Preanger to Pasoeroean, Java
			iS M₁	5 51 25					
			M ₂	5 53 10					
			F	6 14					

SEISMOLOGICAL BULLETIN.

JUNE 1920.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.

Greenwich Mean Time. S. Latitude $6^{\circ} 11' 0''$. Height above sealevel
E. Longitude $7^{\circ} 7' 19''$.

WIECHERT Horizontal Pendulum, 1000 kilograms.

The symbols are according to WIECHERT.

No.	Date 1920.	Character.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
						A _E	A _N		
126	June 4	I	i	h m s		μ	μ	NE.	
			F	18 4 55					
127	" 4	I	eL	25 57				NE.	
			F	0 17					
128	" 8	III _r	iP	4 28 13				6800?	
			M ₁	4 50 13					
			M ₂	4 34 20	6.7	201	242		Malabar, confused record.
			S?	4 36 29					
			MV	4 36 44	6.7	255	269		
			eL	4 43 9					
			F	6 27					
129	" 8	II _r	iP	6 42 53				NE. overlapped by 128. Malabar P — eS? = 189 sec.	
			M	6 47 53					
			F	7 3					
130	" 9	I	e	16 47 2				$\Delta = 1850?$ Felt in Menado, Celebes.	
			i	16 51 57					
			F	16 59					
131	" 7	I _v	eP	10 46 43				S in hour eclipse. Malabar eP — eS = \pm 42 sec. $\Delta = \pm 370$. Felt at Tandjoeng Sakti, Benkoelen, Sumatra.	
			S	10 47 43					
			F	10 56					
132	" 9	III _r	P ₁	11 55 40				E — W. Malabar iP ₂ — S ₂ = 240 sec. $\Delta = 2440$. Felt on the Isles of Amboina and Ceram, Moluccas.	
			P ₂ ?	11 56 50	4.9	112	82.6		
			M	11 57 58	6.1	145	245		
			eS ₁	11 59 46					
			S ₂ ?	11 40 43	8.5	392	575		
			M	11 43 14	6.3	272	413		
			eL	11 55					
			F	12 50					
133	" 10	I	L	2 24 19				N 56,8 E. Malabar faint.	
			F	2 26 11					
134	" 10	II _r	iP	2 36 2				1970	
			S	2 39 24	6.2	87.0	77.4		
			M	2 42 14					
			F	3 10					

SEISMOLOGICAL BULLETIN.

JULY 1920.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.

Greenwich Mean 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 1920.	Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
								A _E	A _N		
144	July 1	I _v	P	h	m	s	800 < 000	μ	μ	120	Malabar i P — S? = 8 sec. $\Delta = 80?$ Felt in the Preanger, Java.
			iS	21	46	18					
			M	21	46	52					
			F	21	47	49					
145	» 2	I	eP	8	54	46	800 < 000	18	18	91	ca E-W.
			i	9	5	28					
			M	9	4	48					
			F	9	6						
146	» 2	II _r	iP	10	11	6	800 < 000	18	18	3100?	ca E-W. Malabar very faint.
			i	10	12	40					
			i	10	15	27					
			S?	10	15	55					
			F	10	28						
147	» 2	I _u	e	18	48	48	800 < 000	18	18	5140	ca E-W. Malabar i P — i S = 403 sec. $\Delta = 5010.$
			M	18	50	17					
			iS	18	55	39					
			M ₁	18	56	32					
			M ₂	18	57	29					
			eL	19	5						
			F	19	17						
148	» 2	II _r	P ₁	21	41	51	800 < 000	159	81.1	2250	Felt on the Isle of Amboina, Moluccas.
			iP ₂	21	42	17					
			iS ₁	21	45	34					
			S ₂	21	45	57					
			M ₁	21	46	46					
			M ₂	21	47	52					
			M ₃	21	49	5					
			M ₄	21	58	45					
			L	22	0	52					
			F	22	27						
149	» 3	I	e ₁	15	55	42	800 < 000	82	81	80	Very faint traces of EW-component.
			e ₂	16	4	34					
			F	16	12						
150	» 4	I	e	17	14,0		800 < 000	82	81	80	
			F	17	20						
151	» 5	I	e	5	6,1		800 < 000	82	81	80	
			F	5	13						

Nº.	Date 1920.	Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Distance of epi- centrum	Remarks.
				A _E	A _N	h	m	s	μ	μ	
152	July 5	I	e F	11	58	1					
				11	41						
153	" 6	I	e M F	5	11,5						
				5	20,5						
				5	28						
154	" 7	I	e M F	9	58	59					
				9	43	59					
				9	57						
155	" 7	I	e M F	20	4	21					
				20	11	51					
				20	14						
156	" 8	III	iP ₁ i ₁ i ₂ M ₁ M ₂ F	4	41	11					N 69° W.
				4	41	52					
				4	45	7	5.9	>499	480		
				4	44	3	6.3	110	484		
				4	47	7					
				5	47						
157	" 8	I _r	P iS M ₁ M ₂ F	19	41	41					1560 E — W. Felt on Eastern Java and Bali.
				19	44	23					
				19	44	53					
				19	45	57					
				19	54						
158	" 8	I	e F	20	11	15					Bali.
				20	15	48					
159	" 8	I	e F	22	14	49					
				22	20						
160	" 9	I _r	P i S = M ₁ M ₂ F	0	59	16					1140 SE-Borneo.
				0	39	44					
				0	41	17					
				0	41	49					
				0	52						
161	" 9	I _v	eP iS F	15	47	53					270 Malabar faint.
				15	48	4					
				15	50	1					
162	" 9	I _r	e M F	25	19	8					
				25	25	15					
				25	38						
163	" 10	I	e M F	9	42	40					
				9	49	46					
				9	52						
164	" 11	I	e M F	8	18	45					
				8	21	10					
				8	25						
165	" 18	I	e F	11	47	56					Malabar P — S = 35 sec. △ = 510.
				11	52						
166	" 18	I _v	eP S M ₁ M ₂ F	12	25	40					580 Malabar P — S = 17 sec. △ = 150. Felt in Central Java.
				12	26	20					
				12	26	25					
				12	27	29					
				12	53						

Nº.	Date 1919.	Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Distance of epi- centrum	Remarks.
				A _E	A _N	h	m	s	μ	μ	
167	July 20	I	e F	23	10	20					Malabar faint. Felt at Tjikentjreng (Preanger), Java.
				23	12						
168	" 26	I _v	eP iS M F	10	12	47					210 ca E-W.
				10	13	11					
				10	14	9					
				10	19						
169	" 26	I _v	e F	20	5	59					Probably felt at Tandjong Sakti (Benkoelen), Sumatra.
				20	11						
170	" 26	I	e eL F	21	16	55					
				21	23	56					
				21	29						
171	" 28	I	P F	25	14	8					ca E-W.
				25	24						

SEISMOLOGICAL BULLETIN

AUGUST 1920.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.

Greenwich Mean Time. S. Latitude $6^{\circ} 11' 0''$. Height above sealevel
E. Longitude $7^{\text{h}} 7^{\text{m}} 19^{\text{s}}$.

WIECHERT Horizontal Pendulum, 1000 kilograms.

The symbols are according to WIECHERT.

No.	Date 1920.	Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.		
				h	m	s		A _E	A _N				
172	Aug. 3	II _r	iP	5	00	20	6.1	288	294	2270	ENE. Malabar faint.		
			M	5	08	12		10	10				
			S	5	11	7							
			M	5	15	3		288	294				
			eL	5	19								
			F	5	57								
173	» 3	I _u	i	20	17	6	6.0	27.9	38.6	1	82		
			M	20	18	23							
			e _E	20	39	46							
			eL _N	21	9	53							
			M	21	22	4							
			eL _E	21	42	41							
174	» 8	I _r	eP	10	34	10		22	22	1	82		
			S	10	37	13							
			F	10	43								
175	» 9	I _v	e	1	24	30		21	21	1	82		
			M	1	25	55							
			F	1	28								
176	» 11	I	e	13	13	53		22	22	1	82		
			F	13	17								
177	» 13	I	P	2	22	47		22	22	1	82		
			F	2	31								
178	» 15	I	e?	7	6	14		22	22	1	82		
			M	7	13	14							
			F	7	27								
179	» 15	I	iP	8	25	59		22	22	1	82		
			M	8	36	45							
			eL	8	43	14							
			F	8	55								
180	» 15	I	e	8	55,8			22	22	1	82		
			F	9	1								
181	» 16	I	i	22	39,8			22	22	1	82		
			F	22	41								



No.	Date 1920.	Character	Phase.	Time (Greenwich)	Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
						A _E	A _N		
182	Aug. 20	I _u	e	h m s		μ	μ		
			M	16 36 21					
				16 37 53					
			eL ₁	17 26 53	21.0				
			eL ₂	17 33 53	19.8				
			eL ₃	17 40 53	11.1				
183	" 23	I _v	P	2 30 22					Malabar i P — i S = 12 sec.
			iS=M	2 30 57					△ = 100.
			F	2 33 15					Tjirenang (Preanger), Java.
184	" 23	II _v	P	6 18 0					
			S?	6 18 31					
			M	6 19 27	6.0	184	173	270?	E-W.
			F	6 31					Benkoelen and Lompongs, Su- matra.
185	" 25	I _v	P	3 54 28					
			iS=M	3 54 51					
			F	4 6					
186	" 25	I	e	17 30					
			F	17 33					
187	" 25	I	e	22 1 48					
			i ₁	22 2 55					
			M ₁	22 4 32					
			i ₂	22 7 24					
			M ₂	22 7 31					
			M ₃	22 10 24					
			eL	22 17 36					
			F	22 28					
188	" 26	I	e ₁	23 16 33					
			e ₂	23 24 35					
			F	23 32					
189	" 27	I	e	3 31					
			eL _E	3 40 51					
			F	3 43					
190	" 28	I	e	3 31					
			eL _E	3 40 51					
			F	3 43					
191	" 29	I	e	3 31					
			eL _E	3 40 51					
			F	3 43					

SEISMOLOGICAL BULLETIN.

SEPTEMBER 1920.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.

Greenwich Mean 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 1920.	Character.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
						A _E	A _N		
190	Sept. 3	II _v	iP	h m s				150	Malabar i P — i S = 16 sec. $\Delta = 140$. Bantam and Preanger, (Java).
			iS=M	19 36 7					
			F	19 36 24					
191	" 4	I _v	i ₁	14 25 59				220	Malabar i P — i S = 15 sec. $\Delta = 110$. Preanger, (Java).
			i ₂	14 33 34					
			M	14 36 0					
			eL	14 48 2					
			F	15 8					
192	" 7	I _v	eP	4 58 50				210	Azimuth NS. Malabar i P — i S? = 10 sec. $\Delta = 90^{\circ}$. Azimuth S 65 W. Preanger, Batavia, (Java).
			iS	4 59 15					
			M	5 0 14					
			F	5 8					
193	" 7	III _v	iP	6 47 49				170	Malabar P — S = 15 sec. $\Delta = 110$.
			iS=M ₁	6 48 15					
			M ₂	6 50 54					
			F	7					
194	" 7	I _v	e	12 55 45				8000?	Malabar P — S = 15 sec. $\Delta = 110$.
			S	12 56 4					
			M ₁	12 56 57					
			M ₂	12 57 3	6.0				
			F	12 58					
195	" 9	II _v	i ₁	1 57 21	6.0			202	International Seismological Centre
			M ₁	1 58 26	6.4	46.0	32.0		
			M ₂	1 59 16					
			i ₂	2 0 57					
			M _E	2 3 2	5.8	63.2			
			i ₃	2 6 53					
			M ₃	2 6 38	6.3	59.5	64.8		
			M ₄	2 7 58	6.4	70.8	56.7		
			eL	2 19					
			ML	2 25 32	19.0	108	122		
196	" 9	I _v	i	2 48 19				802	From the ISC collection scanned by SISMOS
			F	3 7					
			i	19 6 22					
			eL	19 22 22					
			M	19 25 22				902	
			F	19 32					

No.	Date 1920.	Character.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)		Distance of epi- centrum	Remarks.
						A _E	A _N		
197	Sept. 10	I _v	e	h m s		μ	μ	Malabar P — i S = 14 sec △ = 120.	In hour mark.
			i	15 50 21					
			M	15 50 27					
			F	15 52 5					
198	" 11	I	?	17 46,7				Felt at Mamasa and Tapalang Central Celebes.	In hour mark.
			F	17 52					
199	" 12	I	e	8 0 41				1610?	Felt at Mamasa and Tapalang Central Celebes.
			eS?	8 5 58					
200	" 12	I	M	8 5 59				Malabar P — i S = 15 sec. △ = 110.	Preanger (Java).
			F	8 17					
			e	15 58 17					
201	" 15	I _v	F	16 2				190	Preanger (Java).
			e	12 32 7					
			S	12 52 29					
202	" 15	I _v	F	12 55				180	Preanger (Java).
			P	15 26 8					
			iS = M	13 26 28					
203	" 15	I _v	F	13 53				180	Preanger (Java).
			i	15 50 22					
			F	15 55					
204	" 14	I _v	e ₁	23 30 18				Malabar e ₁ — e ₂ about 11 minutes. Amboina records two shocks at 23 ^h 28 ^m and 23 ^h 38 ^m	Preanger (Java).
			e ₂	23 41 50					
			M	23 42 22					
			S ₂	23 45 8					
			F	23 55					
205	" 15	I _v	e	7 59 9				2170?	Preanger (Java).
			eL	8 1 10					
			F	8 6					
206	" 20	III	i	14 49 18				Malabar e ₁ — e ₂ about 11 minutes. Amboina records two shocks at 23 ^h 28 ^m and 23 ^h 38 ^m	Preanger (Java).
			M ₁	14 50 56	5.6	141	69.4		
			i ₂	14 51 33					
			i ₃	14 57 33					
			M ₂	15 0 28	6.0	178	146		
			i ₄	15 1 27					
			L	15 5 55					
			M _E	15 15 17	25.4	2580	682		
			M _N	15 15 41	20.0	648	1870		
			M	15 18 32					
207	" 20	I	C	17 5 55				Malabar e ₁ — e ₂ about 11 minutes. Amboina records two shocks at 23 ^h 28 ^m and 23 ^h 38 ^m	Preanger (Java).
			M	17 21 59	21.0				
			F	17 35					
			i ₁	17 52 58					
			i ₂	18 1 46					
208	" 21	I	F	18 8				Malabar e ₁ — e ₂ about 11 minutes. Amboina records two shocks at 23 ^h 28 ^m and 23 ^h 38 ^m	Preanger (Java).
			e	2 44 25					
			i _N	2 52 57					
209	" 21	I	F	3 2				Malabar e ₁ — e ₂ about 11 minutes. Amboina records two shocks at 23 ^h 28 ^m and 23 ^h 38 ^m	Preanger (Java).
			i ₁	17 52 58					
			i ₂	18 1 46					

No.	Date 1919.	Character.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
						A _E	A _N		
210	Sept. 25	I	e	h m s					
			M	1 42 17					
			F	1 44 59					
211	" 25	I	P	5 43 52				7900	
			S	5 52 59					
			F	5 58					
212	" 25	I	e	17 56 30					
			i	17 56 57					
			F	17 12 44					
213	" 25	I	e	19 44 50					
			eL	20 9 42					
			F	20 17					
214	" 24	I	eP	4 22 31					
			M	4 27 0					
			F	4 58					
215	" 27	I	e	15 21 7				Paloe (Menado), Celebes.	
			M	15 27 55					
			F	15 37					
216	" 30	I	P	17 27 57				190	Azimuth WSW.
			S	17 28 18					Malabar P — S? = 22 sec.
			M	17 29 2					△ = 200.
			F	17 34					

SEISMOLOGICAL BULLETIN

OCTOBER 1920.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.

Greenwich Mean Time. S. Latitude $6^{\circ} 11' 0''$. Height above sealevel
E. Longitude $7^{\text{h}} 7^{\text{m}} 19^{\text{s}}$.

WIECHERT Horizontal Pendulum, 1000 kilograms

The symbols are according to WIECHERT.

No.	Date 1920.	Character.	Phase.	Time (Greenwich).			Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
				A _E	A _N						
217	Oct. 2	Γ_v	iP	h	m	s	5.5	μ	μ	1	Azimuth ESE. Malang (Pasoeroean), Eastern Java.
			i	13	45	15		05	05	8	
			M ₁	13	45	31		06	06	9	
			M ₂	13	47	44		438	494	10	
			F	13	48	34		388	371	10	
218	" 4	I_v	eP	22	1	29	T.R.	82	82	01	E — W. Kota Agoeng (Lampongs), Sumatra.
			iS	22	1	57		18	0	11	
			eL	22	2	42		42	4	11	
			F	22	6			84	4	11	
219	" 7	I	e	0	15	25	0.12	81	81	11	N.E.
			M	0	16	47		43	42	12	
			F	0	21			03	30	13	
220	" 7	I	e	21	15,9		0.9	82	82	13	N.E.
			F	21	24			82	84	1	
221	" 7	I_v	eP	23	12	11	T.R.	86	1400	1	SE-Borneo.
			eS	23	14	38		86	86	1	
			M	23	17	23		86	86	8	
			F	23	27			86	86	8	
222	" 8	I	e	7	59,9		0.9	82	82	1	N.E.
			F	7	05,8	47		82	82	6	
223	" 8	I	e	8	6	54	0.9	82	82	1	N.E.
			F	8	11			82	82	6	
224	" 8	I	e	19	21		6.5	8	8	4	N.E.
			i	19	23	15		8	8	4	
			F	19	27			8	8	4	
225	" 9	I	e	11	51	57	2.0	03	0	21	N.E.
			iM	11	52	57		18	21	21	
			F	11	56			02	21	21	
226	" 10	I	e	9	24	4	0.9	81	81	3	N.E.
			F	9	30			81	81	3	
227	" 12	I	i	8	8	24	0.9	81	81	3	N.E.
			M	8	12	41		81	81	3	
			F	8	14			81	81	3	
228	" 13	I_v	eP	11	25	41	0.9	Mal			Malacca.
			F	11	26			eP			

No.	Date 1920.	Char- acter.	Phase.	Time (Greenwich)	Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
						A _E	A _N		
229	Oct. 18	H _u	iP	h m s		μ	μ	7010	Azimuth N 35 W.
			i _E	8 22 15					
			i _W	8 23 15					
			iS	8 25 49					
			M	8 30 49	6.3	117	96.7		
			eL	8 49					
			e	8 52					
			M	8 52 51	5.5				
			F	9 9					
230	" 18	I	e	15 28 13					
			F	15 30					
231	" 19	I	e	21 56 14					
			M	21 57 38					
			F	22 1					
232	" 20	I	e	10 8 30					
			M	10 12 22					
			eL	10 22					
			F	10 37					
233	" 22	I	e	10 58 28					
			e	11 0 21					
			M ₁	11 1 24					
			M ₂	11 4 48	5.7				
			M ₃	11 8 26					
			F	11 16					
234	" 22	I	P	12 29 45					
			M	12 30 59	6.0	31.9	33.8		
			F	12 35					
235	" 24	I	e	1 48 25					
			S	1 56 26					
			F	2 12					
236	" 25	I	e	8 20,2					
			M	8 26 47					
			F	8 29					
237	" 26	I	eP	3 30 54			820		
			iS	3 32 5					
			F	3 41					
238	" 27	I	eP	4 5 8					Probably felt in Tapanoeli, Su-
			M	4 7 6					matra.
			F	4 6					
239	" 28	I _u	i	15 9 50					
			M	15 12 21	6.0	40.2	27.6		
			eL	14 2 29					
			F	14 11					
240	" 28	I	e	16 19					
			F	16 24					

SEISMOLOGICAL BULLETIN.

NOVEMBER 1920.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.

Greenwich Mean Time. S. Latitude $6^{\circ} 11' 0''$. Height above sea level 8 m.

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

WIECHERT Horizontal Pendulum, 1000 kilograms.

The symbols are according to WIECHERT.

Nº.	Date 1920.	Character.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
						A _E	A _N		
241	Nov. 1	I _r	i	h m s					Taroena (Sangi isles).
			M ₁	8 58 12					
			M ₂	9 0 52					
			F	9 4 10					
242	» 3	II	P	15 40 55					Malabar P — eS = 150 sec. $\Delta = 1430$.
			i ₁	15 45 0					
			i ₂	15 44 40					
			i ₃	15 46 56					
			M	15 47 18	6.8	88.1	67.8		
			L	15 52 49					
			F	16 14					
243	» 4	I _r	eP	18 58 51				140	
			iS	18 58 47					
			L	18 59 1					
			F	18 41					
244	» 5	I	eP	6 14 50					
			S	6 16 16					
			F	6 20					
245	» 9	II _r	eP	5 49,1				130	No hour marks.
			iS	5 49,3					Malabar P — iS = 24 sec.
			M	5 50,2					$\Delta = 210$.
			F	5 59					Preanger, Java.
246	» 14		eP	23 17 21					
			i	23 18 4					
			eL	23 20					
			F	23 23					
247	» 16	I	e ₁	8 48,9					No hour marks.
			e ₂	9 7,5					
			F	9 9					
248	» 19	I	e	9 54 41				110	Malabar P — iS = 15 sec.
			S	9 55 54					$\Delta = 130$.
			F	10 2					
249	» 23	II _r	iP	6 49 1				650	Azimuth S 37 E.
			iS	6 50 12					Malabar iP — S = ± 44 sec.
			M	6 51 7					$\Delta = 500$
			F	7 14					

No.	Date 1919.	Char- acter.	Phase.	Time (Greenwich).	Period in sec- onds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
						A _E	A _N		
250	Nov. 50	I	e	h m s					
			i	11 12 51					
			M	11 14 8					
			e L	11 18 51					
			F	11 21					
				11 31					

Remarks	Date	Character	Phase	Period in sec- onds	Amplitude (half)	Time (Greenwich)	Depth	Dist- ance	No.
Two point waves	Nov. 50	I	e	1.00	0.00	11 12 51	10	141	241
			i	1.00	0.00	11 14 8	10	142	242
			M	1.00	0.00	11 18 51	10	143	243
			e L	1.00	0.00	11 21	10	144	244
			F	1.00	0.00	11 31	10	145	245
Two point waves	Nov. 51	I	e	1.00	0.00	11 12 51	10	146	246
			i	1.00	0.00	11 14 8	10	147	247
			M	1.00	0.00	11 18 51	10	148	248
			e L	1.00	0.00	11 21	10	149	249
			F	1.00	0.00	11 31	10	150	250
Two point waves	Nov. 52	I	e	1.00	0.00	11 12 51	10	151	251
			i	1.00	0.00	11 14 8	10	152	252
			M	1.00	0.00	11 18 51	10	153	253
			e L	1.00	0.00	11 21	10	154	254
			F	1.00	0.00	11 31	10	155	255
Two point waves	Nov. 53	I	e	1.00	0.00	11 12 51	10	156	256
			i	1.00	0.00	11 14 8	10	157	257
			M	1.00	0.00	11 18 51	10	158	258
			e L	1.00	0.00	11 21	10	159	259
			F	1.00	0.00	11 31	10	160	260
Two point waves	Nov. 54	I	e	1.00	0.00	11 12 51	10	161	261
			i	1.00	0.00	11 14 8	10	162	262
			M	1.00	0.00	11 18 51	10	163	263
			e L	1.00	0.00	11 21	10	164	264
			F	1.00	0.00	11 31	10	165	265
Two point waves	Nov. 55	I	e	1.00	0.00	11 12 51	10	166	266
			i	1.00	0.00	11 14 8	10	167	267
			M	1.00	0.00	11 18 51	10	168	268
			e L	1.00	0.00	11 21	10	169	269
			F	1.00	0.00	11 31	10	170	270
Two point waves	Nov. 56	I	e	1.00	0.00	11 12 51	10	171	271
			i	1.00	0.00	11 14 8	10	172	272
			M	1.00	0.00	11 18 51	10	173	273
			e L	1.00	0.00	11 21	10	174	274
			F	1.00	0.00	11 31	10	175	275
Two point waves	Nov. 57	I	e	1.00	0.00	11 12 51	10	176	276
			i	1.00	0.00	11 14 8	10	177	277
			M	1.00	0.00	11 18 51	10	178	278
			e L	1.00	0.00	11 21	10	179	279
			F	1.00	0.00	11 31	10	180	280
Two point waves	Nov. 58	I	e	1.00	0.00	11 12 51	10	181	281
			i	1.00	0.00	11 14 8	10	182	282
			M	1.00	0.00	11 18 51	10	183	283
			e L	1.00	0.00	11 21	10	184	284
			F	1.00	0.00	11 31	10	185	285
Two point waves	Nov. 59	I	e	1.00	0.00	11 12 51	10	186	286
			i	1.00	0.00	11 14 8	10	187	287
			M	1.00	0.00	11 18 51	10	188	288
			e L	1.00	0.00	11 21	10	189	289
			F	1.00	0.00	11 31	10	190	290

SEISMOLOGICAL BULLETIN

DECEMBER 1920.

BATAVIA OBSERVATORY, JAVA.

Foundation: River Quartair.

Greenwich Mean Time. S. Latitude $6^{\circ} 11' 0''$. Height above sealevel
E. Longitude $7^{\circ} 7' 19''$.

WIECHERT Horizontal Pendulum, 1000 kilograms

The symbols are according to WIECHERT.

No.	Date 1920.	Char- acter.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
						A _E	A _N		
251	Dec. 1	I	e	4 51 4		μ	μ	9 1 8 0 0 0 0 0 0	
			M	4 51 42					
			F	4 55 4					
252	» 1	I	e	13 18 57		0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	9 1 8 0 0 0 0 0 0	800
			i	13 19 48					
			M	13 20 24					
			F	13 25					
253	» 1	I _v	P	19 25 52		1 0 0 0 0 0 0 0 0	1 0 0 0 0 0 0 0 0	9 1 8 0 0 0 0 0 0	800
			iS	19 25 55					
			L	19 26 51					
			F	19 29					
254	» 2	I	e	12 54 56		0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	9 1 8 0 0 0 0 0 0	800
			M	12 55 42					
			F	12 58					
255	» 2	I	e _E	18 54 52		0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	9 1 8 0 0 0 0 0 0	800
			M	18 55 23					
			F	18 58					
256	» 3	I _v	e	19 50 9		0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	9 1 8 0 0 0 0 0 0	800
			i	9 50 51					
			L	9 51 17					
			M	9 52 27					
			F	9 56					
257	» 4	I	e	2 16 31		1 0 0 0 0 0 0 0 0	1 0 0 0 0 0 0 0 0	9 1 8 0 0 0 0 0 0	800
			F	2 21					
258	» 4	I	e	6 4 15		0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	9 1 8 0 0 0 0 0 0	800
			i ₁	6 5 6					
			i ₂	6 15 57					
			F	6 18					
259	» 4	I	e	18 54 53		0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	9 1 8 0 0 0 0 0 0	800
			M ₁	18 56 47					
			M ₂	18 58 45					
			F	19 5					
260	» 5	I	e	22 4 37		0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	9 1 8 0 0 0 0 0 0	800
			M _N	22 15 37					
			F	22 25					

No.	Date 1920.	Character.	Phase	Time (Greenwich),			Period in seconds.	Amplitude (half) A _E A _N	Distance of epi- centrum	Remarks.
				h	m	s				
61	Dec. 6	I	e	10	42	55	6.0	410 45.6	4800	Azimuth S 72° E. ± 18° S; ± 150° E.
			i	10	25	12				
			M ₁	10	44	56				
			M ₂	10	45	48				
			eL	10	51					
			F	11	0					
62	" 7	I	e	6	5	47	6.4	50.0 45.0	4800	Azimuth S 72° E. ± 18° S; ± 150° E.
			i	6	7	9				
			F	6	10					
63	" 7	I	e	15	24	20	6.0	410 45.6	4800	Malabar records.
			i	15	52	33				
			F	15	58					
64	" 8	I	e	5	39	56	6.7	425 478	4800	Malabar records.
			i	5	41	21				
			M	5	41	51				
			F	5	47					
65	" 8	I	e	16	40	20	6.7	425 478	4800	Malabar records.
			i	16	40	44				
			M	16	41	25				
			F	16	47					
66	" 8	I	e	16	55	15	6.7	425 478	4800	Malabar records.
			M	16	56	19				
			F	16	59					
67	" 8	I	e	20	39	15	6.7	425 478	4800	Malabar records.
			i	20	40	16				
			F	20	45					
68	" 9	I	e	14	8	40	6.7	425 478	4800	Malabar records.
			M	14	10	13				
			F	14	15					
69	" 10	I	i ₁	4	48	46	6.0	120 62	4800	Menado, Celebes.
			i ₂	4	50	52				
			i ₃ E	4	52	29				
			L _E	5	22	22				
			M _E	5	22	28				
			L	5	56	45				
			M	5	38	25				
			eL	5	58	41				
			eL _E	6	8	41				
			eL _E	6	14					
70	" 10	I	e _E	20	35	7	6.0	120 62	4800	E-W.
			i	20	36	10				
			M	20	37	47				
			F	20	43					
71	" 13	I	e	3	51	38	6.0	20.5 24.4	4800	Pekalongan, Central Java.
			M ₁	3	59	7				
			M ₂	4	1	56				
			L	4	6	34				
			F	4	10					

No.	Date 1920.	Character.	Phase	Time (Greenwich),			Period in seconds.	Amplitude (half) A _E A _N	Distance of epi- centrum	Remarks.
				h	m	s				
272	Dec. 16	III	iP	12	15	49	6.7	425 478	4800	Azimuth S 72° E. ± 18° S; ± 150° E.
			i ₁	12	15	25				
			M	12	15	58				
			i ₂	12	18	46				
			S	12	20	21				
			M ₁	12	20	42				
273	" 16	I	M ₂	12	28	3	5.8	422 485	4800	Malabar records.
			L	15	52					
			F	15	52					
			P	21	20	6				
			M	21	22	31				
274	" 17	III	i	21	28	11	5.8	422 485	170	Azimuth S 78,6° E. Malabar e — i = 46 sec. Δ = 410.
			S	9	25	13				

No.	Date 1920.	Char- acter.	Phase.	Time (Greenwich).	Period in seconds.	Amplitude (half)		Distance of epi- centrum.	Remarks.
						A _E	A _N		
281	Dec 24	III _r	iP	h m s		μ	μ	320	Azimuth S 69° W. Malabar P — iS = 44 sec. △ = 390. KM.
			S	17 30 28					
			M	17 30 55					
			F	18 0					
282	> 25	II _r	iP	11 41 21	6.0	124	117	4690	NNW—SSE. Malabar faint.
			i	11 44 8					
			iS	11 47 47					
			i	11 49 16					
			i	11 57 20					
			M	11 58 11					
			F	12 37					
283	> 28	I	iP	3 24 54				572	Azimuth S 69° E. Malabar faint.
			S?	3 40 32					
			eL	3 44					
			F	3 50					
284	> 30	I	e	16 25 58				572	Azimuth S 69° E. Malabar faint.
			M	16 28 18					
			F	16 50					

Amplitude S 69° E.
Malabar P — iS = 46 sec.
△ = 390. KM.

0	02	15	18	31	52
15	02	15	18	31	52
11	02	15	18	31	52
05	02	15	18	31	52
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183	02	15	18	31</td	