No. 25. 1933.

Geodætisk Institut

Proviantgaarden, Copenhagen, Denmark.

Bulletin

of the seismological station

KØBENHAVN

$\varphi = 55°41'$ N. $\lambda = 12°27'$ E. $h = 13$ m.

Lithologic foundation: chalk.

No. 25. Jan.—March 1933.

Instruments:

Galitzin pendulums with galvanometric registration.

Constants:

Component	l	T_1	A_1	μ^2	T	k
	cm	sec	cm		sec	
N	12.5	12.62	100	0.01	12.0	105
E	12.5	12.62	100	0.06	11.9	101
Z	14.5	10.02	100		ca. 6	

Wiechert 1000 kg. horizontal seismograph.

Wiechert 1300 kg. vertical seismograph.

Constants:

Component		T	v	ϱ	V
		sec		mm	
N		9.3	4.1	0.6	225
E	$^1/_1$—$^{15}/_3$	9.8	4.2	0.7	195
	$^{15}/_3$—$^{31}/_3$	9.4	4.2	0.5	200
Z		5.4	4.6	0.1	170

Milne-Shaw seismographs, N and E components, with the approximate constants $T = 12^s$ $v = 20$ $V = 300$

København.

No.	Date	Hour	Forerunners P	Forerunners S			L	Undefined	△	Remarks
	1933 Jan.		m s	m s	h m s	m s	h m	h m	°	
1	1	9			7 49	11 1	.8			*e* 11m57s. Disturbed.
2	3	16					.1			Very strong microseisms.
3	4	1	37 42				1.2			" " "
4	4	4	10 5						75	" " "
5	7	4	18 28	28 8	21 18	33	.7			Pacific Ocean.
6	8	7					.2			
7*	9*	2	*i* 9 26	*i*15 37	*i*12 18	19 2*				Pamir.
8	12	2					.0			
9	17	16					.5			Faint.
10	17	19			19.9		.7			
11	17	22					.7			
12	18	9					.3			Beginning disturbed.
13	21	16			42 32		48			Altaï.
14*	21*	19	34 47	46 22	38 58	45 26	61			Indian Ocean.
15	23	18			*i*33 7		1.0			
16	23	20					.5			Faint.
17	24	16			2.3		.4			
18	27	22			59 47		1.6			Strong microseisms.
19	29	12					.2			Faint.
20	29	18						.8		
	Febr.									
21	3	22	23.2	32.6			.8			Strong microseisms
22	13	2	57 50				1.2			Altaï. Strong microseisms.
23	16	9			32		1.1			Disturbed.
24	19	5			8		.4			No *G. N* and *E* records.
25	19	9			14		.7			" " " " "
26	20	10					34			
27	20	11		21.3			37			Bering Sea.
28	21	19			.3		.4			Persia.
29	22	4					.7			
30	22	18	5 13	11 52			18		45	Tien Shan. *P* quite small. No *G. Z* record.
31*	23*	8	23 11		*i*27 21		.9			Pacific Ocean off Chile.
32	24	18			.1		.4			
33	25	1					1.1			Small preceding movement.
34	25	4					50			Small.
35	25	12					12			
36	25	23		28 47			31			Mediterranean Sea. No *G. Z* record.
37	26	3					0			
38	26	5					.6			Faint.
39	27	16					1.4			Small preceding movement.
40	28	1					.1			
41	28	22					.5			
	March									
42	1	16					.7			
43	2	8								
44*	2*	17	*i*42 48	52 41			63			Disturbed by change of sheets. Pacific Ocean *E* of Japan.

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No.	Date	Hour	Forerunners P	Forerunners S			L	Undefined	△	Remarks
	1933 March		m s	m s	h m s	m s	h m	h m	°	
45	2	20	54 42				1.4			Superposed on preceding shock.
46	3	1					.0			
47	3	2	32 15		43 29		1.1			*P* quite small, uncertain.
48	3	4			.9		1.3			
49	3	9	*i*24 44	34 15	27 33		.9		74	Pacific Ocean near Japan.
50	3	12					.6			
51	3	15					.7			Small preceding movement.
52	3	16					.6			
53	3	16					.9			
54	3	19			26.5		.8			Small preceding movement masked by microseisms.
55	3	21					.0			
56	4	7					.4			Faint.
57	5	9					.2			
58	6	13					.6			
59	7	14					48			
60	8	2					.3			
61	9	20			53.0		2.1			
62	10	6					.4			
63	10	8								Disturbed by change of sheets.
64	11	2	6 30	16 43	9.7	22.1	33		82	*e* 17m40s. California.
65	11	7			49.5		1.4			Faint.
66	11	14	33 42	43 16			1.0		74	*E* of Japan.
67*	11*	19	*i*44 32		*i*46 25					Japan.
68	12	0					.8			Faint.
69	12	5					.8			
70	13	8					.0			
71	14	1	23 59	27 34	27 47		29		20	Aegean Sea.
72	14	2					.0			Superposed on preceding shock.
73	15	5					1.3			Forerunners masked by microseisms.
74	17	16	6 18	15 11	9.0	15.9			67	*e* 19m.7. Kamtchatka.
75	17	19			50	56.8	1.3			Masked by microseisms.
76	18	3			35		.9			" " "
77	18	16		13 27						
78	18	23					.9			
79	22	2					44			Turkestan
80	22	18		22 22			24			Ionian Sea.
81	23	17		56 30			1.1			Mongolia.
82	25	13					.5			
83	26	19					.7			
84	28	4	31 8	39.7			.9		64	Alaska.
85	30	21					.2			Faint.
86	31	22					.5			

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NOTES

No. 7. Jan. 9. 2^h. Pamir; $\triangle$ = ca. 40°. Deep focus. Phases in forerunners large and clearly marked. Additional readings: i_Z 10^m38^s; 11^m17^s; 16^m52^s. $18^m.8$; 19^m2^s very large.

No. 14. Jan. 21. 19^h. Indian Ocean; $\triangle$ = ca. 100°. *P* quite large and clearly marked. *PP* larger; on *N* and *E* a clear onset 38^m58^s, on *Z* some earlier increase of movement. *PPP* $41^m.1$. $\overline{S_cP_cS}$ 45^m26^s; S_N 46^m22^s; *PS* 47^m28^s. *PPS* 48^m27^s. *SS* $53^m.1$; *SSS* $56^m.7$. *L'* 21^h5.

No. 31. Febr. 23. 8^h. Pacific Ocean off Chile; $\triangle$ = ca. 100°. Phases clearly marked. *i PP* 27^m21^s large. $\overline{S_cP_cS}$ 33^m53^s. *i* 34^m15^s large. e_N 34^m59^s; e_N 35^m18^s. *PS* 36^m23^s and *PPS* 37^m34^s large on *E*. *SS* $41^m.7$.

No. 44. March 2. 17^h. Pacific Ocean *E* of Japan. Very strong record. Phases large and conspicuous, but beginnings not clearly marked owing to continued strong oscillatory movement. *i P* 42^m48^s quite small, *i* 42^m52^s larger; very large movement sets in 43^m4^s. *ePP* 45^m42^s; increase of movement $45^m.9$ and again 46^m3^s. *PPP* 47^m38^s. The beginning of *S* about 52^m41^s, possibly earlier; i_N 52^m57^s, i_E 53^m6^s. *SS* $57^m.7$. *L* very large; pen thrown off Wiechert *E*.

No. 67. March 11. 19^h. Japan. Deep focus. Additional readings: 48^m2^s; *eS* 54^m8^s; *iS* 54^m21^s large; 57^m39^s; 60^m18^s.

BIANCO LUNOS BOGTRYKKERI A/S
KØBENHAVN

No. 26. 1933.

Geodætisk Institut

Proviantgaarden, Copenhagen, Denmark.

Bulletin

of the seismological station

KØBENHAVN

φ = 55°41′ N. λ = 12°27′ E. h = 13 m.

Lithologic foundation: chalk.

No. 26. April—June 1933.

Instruments:

Galitzin pendulums with galvanometric registration.

Constants:

Component	l	T_1	A_1	μ^2	T	k
	cm	sec	cm		sec	
N	12.5	12.62	100	— 0.09	12.0	104
E	12.5	12.62	100	0.04	12.0	101
Z	14.5	10.02	100	0.1	10	100

Wiechert 1000 kg. horizontal seismograph.

Wiechert 1300 kg. vertical seismograph.

Constants:

Component	T	v	ϱ	V
	sec		mm	
N	9.4	4.5	0.7	225
E	9.7	4.5	0.7	200
Z	5.4	4.3	0.2	170

Milne-Shaw seismographs, *N* (until $^6/_5$) and *E* components, with the approximate constants T = 12^s v = 20 V = 300.

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No.	Date	Hour	Forerunners P	Forerunners S	Forerunners	Forerunners	L	Un-defined	△	Remarks
	1933 April		m s	m s	h m s	m s	h m	h m	°	
1	1	16	10 46	20.5			.7			Japan; *P* and *S* small, not quite [certain.
2	1	23					.3			
3	2	10					.9			
4	2	21					29			
5	4	12					.8			
6	9	2	58 30	68 14	61.4	73.3	1.4		76	E of Japan.
7	9	4					.7			Superposed on preceding shock.
8	9	11					.2			
9	9	21					.9			
10	16	7					.5			Some preceding movement masked by microseisms.
11	16	19			36	45 39	1.2			
12	16	21					.5			*L'* of preceding shock?
13	19	2			29.1		1.0			Small preceding movement. No *G. Z* record.
14	19	3					.6			Superposed on preceding shock.
15	19	6	56 50	66 54	59.9	67 24	1.4		80	Formosa region.
16*	23*	6	2 22	6 18			8		22	Aegean Sea.
17	23	7		35 23			.9			E of Japan.
18	23	9					.1			
19	25	22			39 7	42 28	45			Forerunners largest on *Z*.
20*	27*	2	*i* 46 32	55 4*					63	Alaska.
21	27	12	7.1	16 36	17.1		.5		74	South of Aleutian Islands.
22	28	22		37 53			41			Mediterranean Sea. *P* quite small, [about 34^m10^s.
23	30	5					.2			
	May									
24	1	10					.9			Faint.
25	1	18	41 43							„ . South of Kurile Islands.
26	1	19	1.3		11 0					
27	1	20	*i* 2 42	12.2			.4		74	Superposed on preceding shock.
28	1	23	24 2*		*i* 27 55		.9			
29	2	17					.3			
30	4	0					.2			
31	5	4						.6		
32	6	5	*i* 46 29	57 18	56 57*	63	1.2			Pacific Ocean.
33	6	20			30.2	54 15	1.2			$30^m.2$ seismic?
34	7	17					.2			
35	7	23					.7			
36	8	1					23			Small preceding movement.
37	8	10	*i* 46 37	57 35	50.0	57.3	1.2			Pacific Ocean off Mexico.
38	8	17					.6			
39	8	18	14 11		25.1		.8			*P* small, uncertain.
40	9	2			58.2		1.4			
41	11	0						.9		
42*	11*	19	13 43	16 50					17	Greece.
43	12	16					.8			
44	14	11					.1			
45	15	3		29.5			34			Asia Minor.

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No.	Date	Hour	Forerunners P	Forerunners S	Forerunners	Forerunners	L	Un-defined	△	Remarks
	1933 May		m s	m s	h m s	m s	h m	h m	°	
46	15	20	6 29	10 31*			14		23	Creete.
47	16	1	24 44	34 51	24 50	35 6	.9		81	Sumatra.
48	16	11			22.9		27			
49	16	12					27			
50	16	16			52		1.3			
51	18	0	*i* 6 25	15 19			.5		67	Kamtchatka.
52	18	10					55			
53	19	13					.1			
54	19	17					51			
55	19	18	8 21	16 42	12.1	18.3	.4		62	Atlantic Ocean.
56	20	4			57 57		1.8			Tonga Islands.
57	20	9					.5			
58	21	9					.5			
59	21	12			12.7		.7			
60	21	20						.9		
61	21	22					.4			
62	22	12					.8			Faint.
63	23	17					.4			Small preceding movement.
64	23	21					.7			
65	27	0					.1			
66	27	5					.5			
67	27	22			59		1.4			
68	28	19					58			
69	29	10					1.5			Small preceding movement.
70	30	12			6 51		.4			
71	30	14					.6			Small preceding movement.
72	31	20					4			Greece.
	June									
73	1	2	44 45	47.8			50		17	Turkey.
74	2	5					.6			
75	2	7	50 50	60 44			1.3		78	Japan.
76	2	13					.2			
77	3	17	21 21	31 34			.9		82	China Sea. No *G. N* record.
78	4	13					.5			
79	4	14			0.2		.6			
80	6	2	*i* 41 17		51 43	51 59	1.2			China Sea.
81	6	7			7.8		.5			
82	7	6			10 41		.9			
83	7	11	*i* 56 58	65 50	66 56		1.3		67	China.
84	8	18	*i* 22 30	32 13	25 23		48		76	Japan.
85	10	12	*i* 11 20	15 4					21	Iceland. *L* immediately after *S*.
86	10	13					46			
87	10	14					24			
88	10	15					22			
89	10	16					40			
90	10	20					48			
91	11	14					.6			
92	12	15			42 35		1.0			

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No.	Date	Hour	Forerunners P	Forerunners S			L	Undefined	△	Remarks
	1933 June		m s	m s	h m s	m s	h m	h m	°	
93	12	21	*i*20 6	29 48			.8		76	Japan.
94	13	11					.5			
95	13	15						.2		Faint.
96	13	20	*i*45 19	54 52	48 7		70		74	Japan.
97	13	22	30 16				.9			Alaska. *S* uncertain about 38.m8.
98	14	21					.5			[No *G. E* record.
99	15	18	46.4	50.6			53			
100	16	1					.7			
101	18	4					1.0			Preceding movement masked by
102	18	13					.9			[microseisms.
103*	18*	21	*i*49 28	*i*59 14	52 23	64.0	1.2		77	Japan.
104	19	18	*i*58 12	66.7			82		63	Alaska.
105	21	14			6		.6			
106	24	14					.9			
107*	24*	22	8 15		19 1	19.4	.8			South Sumatra.
108	25	6					.6			
109	25	10					.6			
110	25	18					.8			
111	25	20			58.7	67.2	1.4			
112	27	4					.5			
113	27	15			50 46		54			Small preceding movement.
114	28	6						.0		
115	28	11		63 10			67			Asia Minor. *P* quite small,
116	28	23	46 18	55.7	49.0		1.1		73	Aleutian Islands. [uncertain.
117	29	2			53		1.2			
118	29	15					.5			Faint.
119	29	16						48		
120	29	17			3 37		6			
121	29	17					.9			Faint.
122	29	18	34 37	38 54			41		24	

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NOTES

No. 16. April 23. 6^h. Aegean Sea. Forerunners very large; possibly depth of focus greater than normal. The beginning of *P* small, increase 2^m24^s and again 2^m27^s. $e_{N,E}$ 2^m46^s and 3^m4^s. *S* clearly marked, largest on *N*.

No. 20. April 27. 2^h. Alaska. Strong increase of *P* 46^m38^s. *S* large on *E*; on *N* increase $55^m.6$. e_E $56^m.4$, $56^m.8$. SS_N 59^m29^s.

No. 42. May 11. 19^h. Greece. Increase of *P* 13^m48^s. S_N 16^m50^s; S_E 16^m55^s. *L* shortly after *S*.

No. 103. June 18. 21^h. Japan. Forerunners large and clearly marked, presumably some depth of focus. *PPP* 54^m11^s. After *S* increase of movement 59^m35^s. e_N 60^m0^s, a large oscillation. *SS* well defined on *E*. *M* of short duration. 86^m some large oscillations.

No. 107. June 24. 22^h. South Sumatra; △ = ca. 95°. *P* small. Movement increases $8^m.8$, $9^m.2$. Between *P* and $\overline{S_cP_cS}$ increasing oscillatory movement. $S_cP_cS_E$ 19^m1^s. $e_{N,E}$ $19^m.4$; e_E $19^m.8$. i_N 20^m12^s. Later much oscillatory movement.

No. 27. 1933.

Geodætisk Institut
Proviantgaarden, Copenhagen, Denmark.

Bulletin

of the seismological station

KØBENHAVN

$\varphi = 55°41'$ N. $\lambda = 12°27'$ E. $h = 13$ m.

Lithologic foundation: chalk.

Nr. 27. July—Sept. 1933.

Instruments:

Galitzin pendulums with galvanometric registration.

Constants:

Component	l	T_1	A_1		μ^2	T	k
	cm	sec	cm			sec	
N	12.5	12.61	100		— 0.12	12.4	104
E	12.5	12.65	100		0.17	12.0	100
Z	14.5	10.02	100	$^1/_7$—$^{23}/_9$	0.3	10	100
				$^{23}/_9$—$^{30}/_9$	0.0	10	100

Wiechert 1000 kg. horizontal seismograph.

Wiechert 1300 kg. vertical seismograph.

Constants:

Component	T	v	ϱ	V
	sec		mm	
N	9.6	4.5	0.7	220
E	9.8	4.5	0.8	200
Z	5.8	4	0.1	170

Milne-Shaw seismographs, N (from $^{14}/_9$) and E components, with the approximate constants $T = 12^s$ $v = 20$ $V = 300$.

BIANCO LUNOS BOGTRYKKERI A/S
KØBENHAVN

København.

No.	Date	Hour	Forerunners P	Forerunners S			L	Un-defined	△	Remarks
	1933 July		m s	m s	h m s	m s	h m	h m	°	
1	1	20					.9			
2	2	12			27.0		29			
3	2	17					.6			
4	2	18					.1			
5	3	15					.8			
6	7	7	39 45	47 1			1.1		51	*P* and *S* quite small. Arabian Sea.
7	9	1	*i* 41 35	51 2	41 49		1.1		73	East of Hokkaido, Japan.
8	9	5			49	58.3	1.3			Mexico.
9	9	9	39 31	49 10	39 36		1.1		75	Kurile Islands.
10	9	9	59 47							Superposed on preceding shock.
11	9	11	33.1				1.0			Pacific Ocean.
12	9	12	*i* 42 12	51.7	52 19	55.9	1.1		74	East of Hokkaido, Japan.
13	9	16	18 38	28.2			.7		74	
14	9	18	3 5				.5			
15	9	19					1.0			Small preceding provement.
16	9	21	47 2	50 30			54		19	Greece.
17	9	22	26 25	35.9			.9		74	Kurile Islands region.
18	10	0	*i* 33 27	43 14	36 21	38 10	1.0			*e* 43m31s East of Japan. Deep focus.
19	10	3	34 55*		45.4	46.9	1.1			South of Mexico.
20	10	7					.0			
21	10	10			52 37	58 27	1.5			62m3s, 68m.1 New Guinea.
22	10	12					.7			
23	10	14					.2			
24	11	6			37.2		43			
25	11	7			12.1		.5			
26	11	8						.1		Superposed on preceding shock. Disturbed.
27	12	12	39 29							Disturbed.
28	13	4					.6			
29	13	8					.6			Preceding movement disturbed.
30	13	15					.4			
31	13	23					.8			Faint.
32	14	1	*i* 57 35		61.2					Deep focus.
33	14	4					1.1			Some preceding movement.
34	15	20					.0			
35	15	22					.7			
36	16	7					.4			
37	17	10					.8			
38	18	6					.2			
39	18	19					.9			Preceding movement disturbed.
40	19	5					.6			
41	19	11			.1		.4			
42	19	13	43 53	53.3	44 7		1.2			Aleutian Islands region. *S* quite small, uncertain.
43	19	15	*i* 11 23	20 53			.6		74	Aleutian Islands region.
44	19	20	*i* 11 49	15 42	12 15		18		22	Asia Minor.
45	19	21					.4			
46	20	23	*i* 25 53	35 40	28 47		.9			Japan. Rather deep.
47	21	7		49 11	50 3					

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No.	Date	Hour	Forerunners P	Forerunners S			L	Un-defined	△	Remarks
	1933 July		m s	m s	h m s	m s	h m	h m	°	
48	21	20			26.6	32.3				
49	22	6					.3			36m.4; 42m.6. Atlantic Ocean.
50	22	7					.2			Faint.
51*	22*	21	*i* 6 40	*i* 15 53	11 5	16 46	26		71	Pacific Ocean.
52	23	4			.5	37 42	1.0			38m39s. Peru.
53	23	8					.2			
54	23	9					1.0			
55	24	8								Beginning lost by change of sheets.
56	24	19			56 34					Disturbed.
57	25	13			15 7	18 41	1.0			Samoa.
58	26	5			.9					
59	27	1					.5			
60	27	2					.2			
61	27	22					.5			
62	30	17			37.9		1.3			
63	31	11	41 23	45.9			49			*P* and *S* quite small, uncertain.
64	31	15			47.5		1.2			
	Aug.									
65	1	11			58 18		60			Small preceding movement.
66	4	18					.1			
67	5	1			5.2	22.3	.7			
68	7	1					.4			
69	7	3			26.4		.7			
70	7	13					.4			
71	9	23			26.6					
72	11	9	4 56	13 47	9 3	18 12	.5		67	China.
73	12	8					.1			
74	12	10					2			
75	12	17			13.1		.5			
76	13	9	41 35		52 24	53.2	1.3			54m5. *L'* 11h.8. Indian Sea.
77	14	22					.8			
78	15	0		56 37			60			Small preceding movement.
79	15	3			21.0		.7			
80	15	11					.5			
81	15	20					.5			
82	17	6	29 25	33 36			38		24	South of Asia Minor.
83	18	9					.1			
84	20	11	58.3		68 44	69.5				Phillippine Islands.
85	22	6					.1			Small preceding movement
86	22	11			16					Recording interrupted 11h24m—
87	22	13			37		1.0			[12h22m.
88	22	21			58					
89	23	7					.0			
90	24	9	43 31				50			Disturbed.
91*	25*	8	1 8	9 55	3 32	14.5	.3		66	China.
92	25	12					16			
93	25	18					.6			
94	26	2					.2			

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No.	Date	Hour	Forerunners P	Forerunners S			L	Undefined	△	Remarks
	1933 Aug.		m s	m s	h m s	m s	h m	h m	°	
95	26	3					.8			
96	26	6					.0			
97	26	20	25 6	29 33			32		25	*P* and *S* small.
98	27	1					.2			Faint.
99*	28*	22			39 55	49 45	70			South Sandwich Islands.
100	29	13					.2			
101*	29*	15			*i* 7 11	*i* 8 56				Brazil.
102	31	3			15		28			
103	31	13					.5			
	Sept.									
104	1	19					.8			Faint.
105	2	16	*i*52 56	*i*62 34	54 28	*i*65 29				56m16s. Japan. Deep focus.
106	2	17					.4			
107	2	21					.9			
108	3	4			10.4		.7			
109	4	23					.8			
110	5	5			21.5		28			
111	6	1					1.6			Small preceding movement.
112	6	10					.6			» » »
113	6	18					.4			
114*	6*	22			*i*27 2					Fidji Islands region.
115	7	9					8			Disturbed.
116	7	10					.3			Faint.
117	7	18					.7			
118	7	22	49.7	58 9			1.1		62	Bering Sea.
119	8	3					.8			
120	8	7			1.5		8			
121	9	5	12 31	20 41	24.1		.6		60	*P* quite small. Manchuria.
122	9	21			39 6	*i*42 26				
123	12	12					.7			
124	12	14					.1			
125	15	17					.1			
126	17	4					.7			
127	20	0					16			
128	20	23			57.3		1.3			Phillippine Islands.
129	21	3	*i*26 14	36.0			.9		77	Japan. *S* quite small.
130	21	4			33.5		.7			Superposed on preceding shock.
131	21	9	59 53	69 40	62 48		87		77	Japan.
132	21	13	54 15				1.4			Japan. *P* quite small.
133	21	20					.4			Small preceding movement.
134	22	12			.0		.8			Disturbed.
135	24	13			30.1		33			
136	24	15	31 4	40 28	33 45	35 46	.9		73	*SS* 45.m5 Pacific Ocean.
137	25	9			57		60			
138	25	13	59 26		70.0	73.0	1.6			*P* quite small. Pacific Ocean.
139*	25*	19	0 27	7 49	2.5	5.8	.3		52	Turkestan.
140	26	3	36 40	39.5			40		15	Italy.

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No.	Date	Hour	Forerunners P	Forerunners S			L	Undefined	△	Remarks
	1933 Sept.		m s	m s	h m s	m s	h m	h m	°	
141	27	22			.1		.7			
142	28	1					.4			Faint.
143	28	2					.1			»
144	28	12					.6			»
145	30	14					1.3			Preceding movement masked by microseisms.

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NOTES

No. 51. July 22. 21^h. Pacific Ocean south of Aleutian Islands. Phases very clearly marked on *N*. *PPP* 11^m5^s. *e* 16^m7^s; *PS* 16^m50^s. *SS* $20^m.6$. L_E 26^m.

No. 91. August 25. 8^h. China. Strong record. *P* large, condensation. *S* smaller, but clearly marked. Waves of period of about 50 sec. in first part of *L*.

No. 99. August 28. 22^h. South Sandwich Islands; $\triangle$ = ca. 120°. *P* quite small, about $35^m.0$. Small increase on *Z* about $38^m.6$; e_Z 39^m16^s. *PP* 39^m55^s followed by large oscillations. e_N 44^m48^s, $e_{N,E}$ 45^m28^s. $(\overline{S_c P_c P_c S})$ 46^m59^s. $(S)_E$ $47^m.9$. *iPS* 49^m45^s large. e_N $51^m.2$, *SS* 56^m large.

No. 101. August 29. 15^h. 8°.3 S 70°.6 W, Brazil, according to J.S.A.; $\triangle$ = ca. 95°. Deep focus. Very clearly marked forerunners: i_Z 7^m11^s; i_Z 8^m56^s. *i* 14^m30^s, *i* 15^m16^s largest on *E*. *L* small.

No. 114. Sept. 6. 22^h. Fidji Islands region; $\triangle$ = ca. 140°. Deep focus. *iP'* 27^m2^s very large. e_Z 29^m39^s; $i_Z e_{N,E}$ 30^m28^s; e_N 33^m33^s, e_Z 33^m42^s. e_N 36^m20^s.

No. 139. Sept. 25. 19^h. Turkestan. e_E $5^m.8$ possibly $P_c S$. $S_{N,Z}$ 7^m49^s; S_E 8^m4^s. *M* large.

BIANCO LUNOS BOGTRYKKERI A/S
KØBENHAVN

No. 28. 1933.

Geodætisk Institut

Proviantgaarden, Copenhagen, Denmark.

Bulletin

of the seismological station

KØBENHAVN

φ = 55° 41′ N. λ = 12° 27′ E. h = 13 m.

Lithologic foundation: chalk.

No. 28. Oct.—Dec. 1933.

Instruments:

Galitzin pendulums with galvanometric registration.

Constants:

Component	l	T_1	A_1		μ^2	T	k
	cm	sec	cm			sec	
N	12.5	12.61	100		— 0.11	12.3	103
E	12.5	12.65	100	$^1/_{10}$—$^{25}/_{11}$	0.1	12.0	100
				$^{25}/_{11}$—$^{31}/_{12}$	— 0.04	12.5	100
Z	14.5	10.02	100		— 0.1	10	100

Wiechert 1000 kg. horizontal seismograph.

Wiechert 1300 kg. vertical seismograph.

Constants:

Component	T	ν	ϱ	V
	sec		mm	
N	9.6	4.2	0.6	220
E	9.7	4.2	0.8	195
Z	5.5	3.8	0.1	160

Milne-Shaw seismographs, *N* and *E* components, with the approximate constants T = 12^s ν = 20 V = 300.

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No.	Date	Hour	Forerunners P	Forerunners S			L	Un-defined	△	Remarks
	1933 Oct.		m s	m s	h m s	m s	h m	h m	°	
1	2	15					.1			
2*	2*	15	42 41		53 17	53 54				Ecuador.
3	3	10			45 53		1.1			
4	3	14						46		Seismic?
5	3	18	50 43	60.6			79		78	Japan.
6	5	6					.5			
7	5	13	37 3	42 47					36	Persia.
8	14	22			40		1.0			
9	16	5					.0			
10	17	14					.3			
11	19	6					.0			
12	21	3		6 38			.4			
13	22	12			.2		.5			
14	22	14					.6			
15	23	1					.4			
16	23	5					.3			
17	23	13			57 26	58.8	1.3			e 64m.1.
18	23	21					.3			
19	24	16					39			
20	25	23			46.1	52 16				52m55s; 53m21s; 54m57s.
21	26	12			26 14	29.7	1.0			
22	30	8					.0			
	Nov.									
23	1	16					.3			
24	1	21								
25	2	12	38 25	47 47	48.5	52.9	19 1.0		72	Aleutian Islands region.
26	3	13					.4			
27	4	9					.3			Preceding movement disturbed.
28	6	7					.4			
29	19	3			9					
30	19	9					.7			Faint.
31*	20*	23	28 35				37			Baffin Bay.
32	22	0			11.9		.5			
33	22	5	4 45		15.3		.5			
34	22	9					.0			Disturbed.
35*	22*	13			1 14	2 37	.6			
36	22	19					.7			
37	22	23					.2			
38	23	1						21		
39	23	3						31		
40	23	19			21.0		.6			No G. Z record.
41	25	17						.9		Faint.
42	27	7						10		»
43	27	19					.9			
44*	28*	11	16 41	22 36	25.4				39	Persia.
45	29	5					.8			
46	29	19					.9			
47	30	4			54.8		1.0			

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No.	Date	Hour	Forerunners P	Forerunners S			L	Un-defined	△	Remarks
	1933 Dec.		m s	m s	h m s	m s	h m	h m	°	
48	2	2					.6			
49	2	6					.3			
50	2	9					.4			Some preceding movement.
51	2	20			37	44.1	1.0			
52	4	19	44 36	53 16	54 0	55.7				P and e_Z 45m56s quite small, un-
53	9	8			1		15			[certain.
54	10	10						25		
55	12	5					.7			
56	12	14			30 4	47 55	1.1			Time not quite certain; time-marks partly failing.
57	13	21	36 37		40 6	47 12	1.1			e 48m30s. Mexico.
58	14	1			59 17		62			
59	14	7			41 23		1.1			
60	14	18	59.0	65 0						P small, uncertain. Persia.
61	15	7	47 39	52 10			54		26	South of Greenland.
62	17	23					25			
63	19	5						51		Strong microseisms.
64	19	18					.1			» »
65	21	1					.3			Faint.
66	21	18					.9			
67	22	0					.0			
68	24	11					.7			

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NOTES

No. 2. Oct. 2. 15^{h}. Ecuador; $\triangle$ = ca. 95°. *P* clearly marked on *Z*. *PP* 46^{m}.7; *PPP* 49^{m}41^{s} $\overline{S_c P_c S}$ 53^{m}17^{s}; *e* 53^{m}27^{s};$(S)_N$ 53^{m}54^{s} large; PS_E 55^{m}.1.

No. 31. Nov. 20. 23^{h}. Baffin Bay. First swing in *P* small, condensation; followed by large oscillations. $e(S)_{N,E}$ 33^{m}53^{s}; iS_N 34^{m}9^{s} followed by very large oscillations. e_E 34^{m}27^{s}.

No. 35. Nov. 22. 13^{h}. In region of 7° S 149° E according to Manila. 1^{m}14^{s} small, on *Z* only. $e_{N,E}$ 5^{m}22^{s}; e_E 12^{m}14^{s}. Later phases not clearly marked.

No. 44. Nov. 28. 11^{h}. Persia. First movement quite small, the reading uncertain; iP 16^{m}50^{s}. eS_E 22^{m}36^{s}; $iS_{N,E}$ 22^{m}42^{s}; i_N 22^{m}49^{s}. *L* irregular.

BIANCO LUNOS BOGTRYKKERI A/S
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