No. 33. 1935.

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. 33. Jan.—March 1935.

Instruments:

Galitzin-Wilip seismographs:

Constants:

Component	l	T_1	A_1	μ^2	T	k
	cm	sec	cm		sec	
N	12.5	12.61	100	—0.1	12.2	103
Z	14.5	10.02	100	—0.1	11	100

E was dismounted on Jan. 5.

Wiechert 1000 kg. horizontal seismograph.

Wiechert 1300 kg. vertical seismograph.

Constants:

Component	T	ν	ϱ	V
	sec		mm	
N	9.5	4.1	0.7	215
E	9.5	4.0	0.7	195
Z	5.4	4	0.2	170

Milne-Shaw seismograph, E component, with the approximate constants $T = 12^s$ $\nu = 20$ $V = 300$.

København.

No.	Date	Hour	Forerunners P	Forerunners S			L	Un-defined	△	Remarks
	1935 Jan.		m s	m s	h m s	m s	h m	h m	°	
1*	1*	13			39 53	*i* 43 8				Pacific Ocean.
2	2	23					.3			
3	3	1	59 57	67 58	62.1	71.8			58	Tibet.
4	4	10					.7			
5*	4*	14	45 38	48 52					18	Asia Minor.
6*	4*	16	24 12	27.6					19	» »
7	4	20					.5			Faint.
	5									No Galitzin records 8^h25^m—15^h5^m.
8	6	7					.6			Faint.
9	7	11					.9			
10	8	13					.6			
11	11	1					0			
12	14	23					.3			Faint.
13	16	6					.6			»
14	17	2			27 39	30.9	1.2			e_N 31^m51^s. New Caledonia.
15	18	2	18.0	25 39					55	*P* quite small, uncertain.
16	18	17			.6		.9			
17	19	1					.0			
18	19	11					.9			
19	19	12			56.8		1.1			
20	22	15			31.9		.9			
21*	23*	7	35 25	44 53	40.0	45 38	55		73	Aleutian Islands.
22	30	1					.0			
23	31	18					.9			
	Febr.									
24	3	2						.5		
25	4	18					.6			
26	6	2	2 19	9 5*	12.3		.3		46	Atlantic Ocean.
27	7	18					15			Small preceding movement.
28	9	20					.0			
29	13	10					.0			
30	18	6					49			
31	22	9					45			
32	22	17	17 20	26 45	26 57*		.6		73	The beginning of *P* uncertain
33	24	12					.2			[17^m20^s or 30^s.
34*	25*	2	56 6	59 59	60 29				22	Crete.
35	27	10					.0			
	March									
36	2	6					.3			
37	4	16					.8			
38	5	10	33 25	*i* 38 47					33	Persia. *P* uncertain, possibly
39	5	22	25 13	32.9			.7		55	earlier than read.
40	7	10	38 21				1.1			Himalaya.
41	10	16					28			
42	11	12					.1			
43	12	13					1.0			Forerunners masked by microseisms.

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No.	Date	Hour	Forerunners P	Forerunners S			L	Un-defined	△	Remarks
	1935 March		m s	m s	h m s	m s	h m	h m	°	
44	13	19					.7			
45	14	13					.4			
46	14	14					.9			
47	14	15			*i* 52 28		1.8			
48	15	11					.1			
49	15	12					.8			
50	17	20					.9			
51	17	21	46 14		49 10	56 52	1.2			
52	18	8	*i* 45 32	49 31	50 13				22	Asia Minor. Disturbed.
53	19	7					34			
54	20	23			18.1	35.1	.9			
55	21	0	14.3	22 53			.6		64	Superposed on preceding shock.
56	24	0					.4			[Bengal.
57	24	15					.2			
58	27	20					.1			
59	28	0		6 14						Manchuria.
60	29	13			7 44		.7			No Galitzin records.
61	30	3					.7			
62	30	16			54 51	61.2				
63	30	21	*i* 31 37	41 25	34 32	46.2	.9		77	Japan.
64	31	3	25 6	28 19			29			Greece. *P* and *S* small, somewhat
										[uncertain.

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NOTES

No. 1. Jan. 1. 13^h. Pacific Ocean; $\triangle$ = ca. 140°. Deep focus. P'_Z 39^m53^s. e_Z 41^m9^s; e $42^m.9$; i_Z 43^m8^s, large; e_N 43^m33^s; e_N $44^m.7$. *SS* $60^m.8$.

No. 5. Jan. 4. 14^h. Asia Minor. The beginning of *P* small, not quite certain; *iP* 45^m42^s. eS_N 48^m52^s; eS_E 48^m58^s, not large, followed immediately by *L*. *M* large.

No. 6. Jan. 4. 16^h. Asia Minor. The beginning of *P* quite small, the reading not certain; *e* 24^m16^s larger movement; followed by much oscillatory movement. *S* small, not clearly marked. e_N $28^m.2$.

No. 21. Jan. 23. 7^h. Aleutian Islands. The beginning of *P* not clearly marked; the reading not quite certain. *PPP* $40^m.0$. *S* 44^m53^s small; *PS* 45^m38^s larger. *SS* $39^m.9$.

No. 34. Febr. 25. 2^h. Crete. Deep focus. The beginning of *P* quite small, followed by increasing oscillatory movement; e_Z 56^m36^s, large. $e_{N,Z}$ 57^m8^s. *S* 59^m59^s, large; $i_{N,E}$ 60^m29^s, larger. *L* small.

Seismometric readings: Notation

P — normal first preliminary tremors, longitudinal waves.
PP... — longitudinal waves reflected at the earth's surface.
S — normal second preliminary tremors, transverse waves.
SS... — transverse waves reflected at the earth's surface.
PS; *PPS*;... — waves reflected at the earth's surface which travel partly as longitudinal, partly as transverse waves.
SKS — waves which traverse the mantle as transverse waves but are refracted through the core with longitudinal oscillation.
PKS — waves which pass the mantle on one side of the core as longitudinal waves, on the other side as transverse waves and are refracted through the core with longitudinal oscillation.
SKKS — waves which traverse the mantle as transverse waves, are refracted through the core with longitudinal vibration and are reflected on its inner boundary.
L — long, or surface, waves; main phase.
M — waves of greatest amplitude in the surface waves.
i — sharply defined beginning of a phase.
e — gradual beginning of a phase.
Δ — arcual distance from the station to the epicentre.
*) affixed to time of phase indicates that the beginning is in a time-mark.
*) affixed to number and date refers to Notes.

BIANCO LUNOS BOGTRYKKERI A/S
KØBENHAVN

No. 34. 1935.

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. 34. April—June 1935.

Instruments:

Galitzin pendulums with galvanometric registration.

Constants:

Component	l	A_1	T_1	μ^2	T	k
	cm	cm	sec		sec	
N	12.5	100	12.61	—0.12	12.4	103
E	12.5	100	12.65	—0.04	12.5	103
Z	14.5	100	10.02		$10^1/_2$	103

Wiechert 1000 kg. horizontal seismograph.

Wiechert 1300 kg. vertical seismograph.

Constants:

Component	T	ν	ϱ	V
	sec		mm	
N	9.6	4.1	0.7	220
E	9.6	4.0	0.7	195
Z	5.3	4.2	0.2	170

Milne-Shaw seismograph, *E* component, with the approximate constants $T = 12^s$ $\nu = 20$ $V = 300$.

Wood-Anderson torsion seismometer, *E* component, $T = 2^s.7$.

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No.	Date	Hour	Forerunners P	Forerunners S			L	Un-defined	△	Remarks
	1935 April		m s	m s	h m s	m s	h m	h m	°	
1	1	3					.9			
2	2	17					.7			Faint.
3	3	7			11.6		.6			
4	3	11	*i* 19 42	25 53	20 52	29.2			41	No G. records. Badakshan.
5	3	12					.4			Superposed on preceding shock.
6	3	22					.3			[M.-S. *E* record only.
	4									No records 9^h58^m—14^h35^m.
7	5	18			12.2		.6			
8	7	15					3			
9	9	10					.7			
10	9	20	5 19	9 47	10 15					Caspian Sea. *P* not quite certain, [possibly earlier.
11	9	23					.9			
12	11	1			39.5		1.0			Indian Ocean.
13*	11*	23	21 29	26 52					33	Persia.
14	12	0	18 9	23 30					33	»
15	12	1	13 26	18 47					33	»
16	12	12	51 15	56 42						» No G. nor W.-*Z* records.
17	12	20					15			[*P* uncertain.
18	12	22	38 40	44 7						» *P* possibly 2 sec. earlier.
19	13	2	36.0	41 26						» *P* small, uncertain.
20	14	6						.1		
21	15	11			35.9	37.8	.9			*e* $41^m.1$.
22	15	22					.0			
23	15	23					.4			Small preceding movement.
24	18	22			28.6		.6			
25	19	4					.9			Faint.
26	19	8					.8			Disturbed.
27*	19*	15	*i* 28 41	33 2*	*i* 28 51					Mediterranean Sea.
28	19	16	*i* 23 58							» » *P* dilatation.
										Superposed on preceding shock.
29	19	18	3 3*	7 24	7 34		9		25	Mediterranean Sea. Superposed on preceding shock.
30	19	20	*i* 36 57	41 15	41 24		43		24	*P* condensation. Mediterranean Sea.
31	19	23					.7			
32	20	5	16 15	20 37	20 47				25	*P* condensation. Mediterranean Sea.
33	20	10						.0		
34	20	11					.9			
35	20	21					.1			
36	20	22	14 7	24 13	25.2	28.9	.6		80	Japan. The beginning of *L* not
37	21	7			50.5	51 24	1.2			[certain. *M* rather large.
38	21	19					57			
39	22	5					.8			
40	22	13			29.3		.6			
41	23	16	*i* 56 20	*i* 65 0	59.1	65.8	1.3		65	*P* condensation. *SS* $69^m.4$. Assam.
42	24	16	4 2*	13.6			.5		75	Indian Ocean.
43	24	19	4 23	14 59	14 44		.6			Mexico.
44	27	19			15.7		20			Azores.
45	29	19			37.1		40			

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No.	Date	Hour	Forerunners P	Forerunners S			L	Un-defined	△	Remarks
	1935 May		m s	m s	h m s	m s	h m	h m	°	
46	1	4					43			
47	1	10	30 10	34 39	31 6	34 47	37		26	Caucasia.
48	2	8					27			
49	2	10					.6			Small preceding movement.
50	2	22					.2			Faint.
51	3	5					.4			
52	4	0						.5		
53	4	2					.7			
54	4	23	14 41	24 46			.7		80	Formosa.
55	5	3					.8			
56	5	19					.1			
57	6	18					.4			
58	6	20					.4			
59	7	6			19.6		.7			Preceding movement disturbed.
60	9	5					.5			
61	10	17					.7			
62	11	19			24.1		26			
63	12	0					.6			
64	12	5			34.9	38.1	.7			
65	12	20					.8			Small preceding movement.
66	13	20	5 10	14 40	7.9	15 20	.5		74	*SS* $19^m.3$; *SSS* $22^m.8$. Siam.
67	14	0			2 44		1.1			
68*	14*	23			41.7	43 1*	1.2			South-Atlantic Ocean.
69	15	2	10 7	17 1*	12 2*		.5		48	Baluchistan.
70	16	17		38.5			.8			Afghanistan. Masked by microseisms.
71	16	21			25.1		.9			Some preceding movement. Masked
72	18	17			44		.9			[by microseisms.
73	18	21			54.8		1.7			
74	20	5			35	45.8	1.2			Celebes.
75	20	18			27.5		.6			
76	21	4	32 26	40.5					59	China.
77	21	7			11 43	17.6	.8			*e* $21^m.3$; *SS* 28^m. Australia. Phases
78	21	12			57	84	2.0			[not clearly marked.
79	21	16					.2			
80	22	9					.0			
81	22	10					.5			
82	23	2					.9			Faint.
83	23	18	8 21	15 50			.4		53	*P* not clearly marked, the reading uncertain. Atlantic Ocean.
84*	24*	5	49 45		60.5	60 51				Pacific Ocean.
85	24	23					.4			
86	25	0	21 11		31.6	33.5	.9			*PP* $24^m.9$; *SS* $38^m.8$. Philippines.
87	25	9					.4			
88	25	22					.3			
89	26	22	17.1		27 38	28.2	.9			*P* uncertain, possibly earlier than
90	27	3			31.6	42.2				[read. *PP* $20^m.9$. Philippines.
91	27	4					.5			*L* of preceding shock?
92	27	6					.3			
93	28	15					.1			

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No.	Date	Hour	Forerunners P	Forerunners S	Forerunners		L	Undefined	△	Remarks
	1935 May		m s	m s	m s	h m s	h m	h m	°	
94	28	17					.6			Small preceding movement.
95	29	20			5.1		.4			Formosa.
96*	30*	21	41 20	48.1	48.6		55		46	Baluchistan.
97	31	2	12 11	19.0			.5		47	»
98	31	8	29 28	38 17					66	No *Z* record. Sea of Japan.
99	31	13		28 43			32			Iran.
100	31	17			22.6	27.5				*e* 30m.7.
	June									
101	1	4	38 37	45 25	48.9		57		47	Baluchistan.
102	1	12					.9			
103	1	14	53.2		57 14	64.3	1.5			Borneo. *P* quite small, uncertain.
104	2	9	*i* 24 52	31 39	26 40	34.9			46	Baluchistan.
105	2	10	*i* 2 39				.5			
106	2	15						3		Seismic?
107	2	17					.6			Faint.
108	4	19					.4			»
109	5	11					54			Italy.
110	8	23					.5			
111	9	7					.4			
112	10	7					.6			
113	11	22			19.5	19 53	.7			
114	14	21					.8			
115	16	7					.4			
116	18	17					.3			
117	18	18					.6			
118	18	22			44.8	51 29	1.3			Small movement on *Z* from about 41m. *e* 51m59s. Pacific Ocean.
119	19	22			36.2		1.3			Salomon Islands.
120	20	1					23			
121	22	16			7.0	13 26	.6			*e* 16m19s; 22m. Celebes.
122	23	7					35			
123	23	16					.4			
124*	24*	23			*i* 42 22	44 58	1.3			New Hebrides.
125	25	12					.6			
126	25	12	45 9	54.5	49.4		69		72	Kurile Islands. *S* somewhat
127	26	0						10		Faint. [uncertain.
128	27	3					.6			
129	27	17			22 3		24			Germany.
130	28	2			20.6	25.9	.9			*e* 30m.3. Off Chile. No G. *E* and *Z* records.
131	28	9						14		
132	28	19			20		.6			No G. *Z* record. Disturbed. Japan.
133	28	21						.2		
134	29	7	*i* 1 48		12 27	13.7	.5			*PP* 5m17s. *SS* 19m. Pacific off Mexico.
135	29	10						.2		Small preceding movement.
136	30	0					.7			
137	30	8	17.3				.6			Iran.

No. 35. 1935.

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. 35. July—Sept. 1935.

Instruments:

Galitzin-Wilip seismographs:

Constants:

Component	l	A_1		T_1	μ^2	T	k
	cm	cm		sec		sec	
N	12.5	100		12.61	—0.1	12.4	103
E	12.5	100		12.65	0.0	12.1	102
Z	14.5	100	1/7—26/7	10.02	0	10½	95
			26/7—30/9	12.13	0	9	88

Wiechert 1000 kg. horizontal seismograph.

Wiechert 1300 kg. vertical seismograph.

Constants:

Component	T	ν	ϱ	V
	sec		mm	
N	9.6	4.4	0.7	220
E	9.7	4.2	0.8	190
Z	5.5	4.1	0.1	170

Milne-Shaw seismograph, *E* component, with the approximate constants $T = 12^s$ $\nu = 20$ $V = 300$.

Wood-Anderson torsion seismometer, *E* component, $T = 2^s.7$.

København.

No.	Date	Hour	Forerunners P	Forerunners S			L	Un-defined	△	Remarks
	1935 July		m s	m s	h m s	m s	h m	h m	°	
1	2	15					.8			Preceding movement disturbed.
2	5	18	0 38	6 45	2 11	9 50			40	Buchara.
3	6	6					.7			Faint.
4	6	22					.7			
5	7	13	35 56		46 12		1.1			Luzon.
6	8	14					.0			
7	9	1					.6			
8	9	2					.9			
9	9	5					.4			
10	9	7			9 19		.6			Small preceding movement.
11	9	12			40.4	46.6	1.2			$47^m.7$; $49^m.9$. Chile. No Galitzin [records.
12	9	15					.7			
13	9	18					.7			
14	9	21					1.1			Small preceding movement.
15	10	20		49 25	54.0		1.1			Indian Ocean.
16	11	8	*i* 36 49	46 43			1.1		78	Japan.
17	11	13			31.2	48.6	1.3			
18	11	23						32		Faint.
19	12	1		57.6			68			Tien Shan.
20	12	3	*i* 49 17							Later movement quite small.
21	12	21					.6			
22	13	0	6 48		9 32					Carpathians.
23	13	1					.3			
24	13	4					.6			
25	15	12						.4		
26	15	14			*i* 32 5	34 50				*e* $38^m.5$; $41^m.4$; $44^m.9$; $49^m.2$.
27	15	18			24.7	30.5	.7			
28	16	16	31 8	41 13	50.6				80	Formosa.
29	16	20			25 2*		.9			Celebes.
30	17	0			8 38	8 44	10			Norway.
31	17	0			41.0	44.2	1.0			Small preceding movement.
32	17	4		50 18	53.2	54.9				*SSS* $57^m.1$. Atlantic Ocean.
33*	17*	11			6.0	11 45	.7			South Atlantic Ocean.
34*	19*	1	1 45	11 40	4 45	16.5	.5		78	East of Japan.
35	19	7					.0			
36	20	7						.2		Faint.
37	20	15					.4			
38	22	7					.3			
39	23	4	6 55	16 14	20.6		.5			
40	24	4					.7			*P* quite small, somewhat uncertain.
41	26	3					5			
42	26	4	56.2	66 43	66.5		1.4			*P* uncertain. Panama.
43	26	8	14 0	23 15	25.9				71	No G. records. W. H. disturbed.
44	26	9					.7			
45	26	10		51 16	58.5		1.1			No G.Z record.
46	27	4					.4			
47	27	17					.7			
48	28	5	*i* 31 52	38 16	33 41	34 10			43	*SS* $41^m.6$. Badakshan.
49	28	7					.2			

København.

No.	Date	Hour	Forerunners P	Forerunners S			L	Un-defined	△	Remarks
	1935 July		m s	m s	m s	h m s	h m	h m	°	
50	29	4			38		1.0			
51*	29*	7			57 33					Pacific Ocean.
52	29	23		31 13			.6			Pamir.
53	30	6			9.8	12.2	.6			
54	31	10					.3			Small preceding movement.
	Aug.									
55	1	5					.5			
56	1	14	19 48		23 29	30 20	.9			(*S*) 30^m48^s. *PS* $32^m.1$.
										Pacific Ocean near Philippines.
57	1	16	21.1		31 28	32 29	.8			» » off Central America.
58	2	11					.0			
59	2	21					.1			Faint.
60	3	1	22 28	32 47	23.5	33 45			83	$35^m.0$; *SS* 38^m. Sumatra.
61	3	5	37 40	41 13	37 44		43		20	Mediterranean Sea.
										No Galitzin records 3^d8^h—19^d16^h.
62	3	11	58 40		69 11	69 46	1.6			*P* small, uncertain. *PP* $62^m.4$.
	3									Recording disturbed 13^h36^m-15^h27^m.
63	3	18					.2			
64	4	2		47.8			1.1			
65	4	10					.4			Faint.
66	4	18					.5			
67	5	15					.0			
68	6	0			19 43		.7			
69	6	14					.5			
70	6	17					.9			Faint.
71	7	9			25 43		.7			
72	8	14					.8			
73	10	18			1.1	8.3	.4			
74	11	8					.4			
75	11	9					.4			
76	11	20			4.4		20			
77*	17*	2			4 5*	*i* 4 13	44			Pacific Ocean.
78	17	8					.1			
79	17	20			49.2		1.2			
80	18	10					.0			Disturbed.
81	19	16					22			
82	20	8		62 50			65			Asia Minor.
83	20	17					.6			
84	21	14			7 59·	11.0	.9			11^m41^s. $29^m.1$. *L* small.
85	22	7					9			
86	22	20	37 56	43 37	39 16	44 16	47		36	Baffin Bay.
87	23	11					.3			
88	23	14	11 2*	22 6	21 35	23.4	.7			*PP* $14^m.9$. *SS* $28^m.4$. Sumatra.
89	25	5	12 52	17 7	13 15	17.9	19		24	Spitsbergen.
90	25	20			58		1.4			
91	26	13					.4			
92	26	16			39 25		43			
93	26	17					.2			

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No.	Date	Hour	Forerunners P	Forerunners S			L	Undefined	△	Remarks
	1935 Aug.		m s	m s	m s	h m s	h m	h m	°	
94	27	6					.1			
95	27	15					.2			
96	29	11					28			
97	31	0					.9			
98	31	17	*i* 51 33	61 2*	68.3		1.3		74	South of Kurile Islands.
	Sept.									
99	1	1					.2			
100	2	3					.4			
101	2	7			35 29	45.0	1.2			
102	2	16					.0			
103	3	11					39			
104	3	17	39 34	42 52			45		18	Greece.
105	3	23					.7			
106	4	1	37 48	46 6			.9		61	Alaska.
107	4	1	50 2*	*i* 60 12	65.6		75		81	Formosa. Superposed on preceding shock.
108	4	3	40.4		50 50		70			Formosa. Superposed on preceding [shock.
109	6	19					.1			
110	6	21					.9			
111	7	18					.6			
112	8	1		28.1			.6			
113	8	17					.9			
114	9	6	31.9		42.5	45.2	61			Caroline Islands. *PP* 35m. *SS* 49m.
115	11	12			5 34		1.0			[*P* quite small, uncertain.
116*	11*	14	*i* 15 35	25 3*	18 16	20 2	35		73	Japan.
117	14	15					.0			
118	15	4					.5			
119	15	11			35 34	45.4	1.2			*PPS* 46m.9. *SS* 52m.4.
120*	15*	14			28.2	31 52	64			Pacific Ocean.
121	16	15					.5			
122	18	5	10 30	20 58			.6		85	
123	18	8		44 52			1.0			Forerunners disturbed. *S* uncertain.
124	18	20					.8			
125*	19*	2			46.6	56.4				*SS* 63m. Pacific Ocean.
126*	20*	2	1.6		6.1	16 4	34			New Guinea.
127*	20*	5			42 43	52 14	78			Pacific Ocean.
128	20	22					.0			No Galitzin or Milne-Shaw records.
129	21	22						.3		
130	22	2					3			
131*	23	9			37 58	47.5	1.1			Pacific Ocean.
132	24	5			36.6		.9			Small preceding movement.
133	24	17					.3			
134	24	22	23 40	32 47	33.8	37.5	.8		70	*SSS* 40m.9 Near Vancouver Island.
135	25	0					.7			
136	25	10			39 16	*i* 48 51	75			*SS* 55m.1. Pacific Ocean.
137	25	13					.5			
138	26	22			.9		.6			
139	27	4					.3			

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No.	Date	Hour	Forerunners P	Forerunners S			L	Undefined	△	Remarks
	1935 Sept.		m s	m s	h m s	m s	h m	h m	°	
140	27	14					.5			
141	27	18						.0		
142	28	16					25			
143	29	6					59			
144	29	13					8			
145	30	0					.9			
146	30	19	6 45	11 35						*P* not quite certain. North of Spitsbergen.

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NOTES

No. 33. July 17. 11^h. South Atlantic Ocean; $\triangle$ = ca. 115°. *PP* $6^m.0$; *SKS* 11^m45^s. e_E $14^m.1$; e_N $15^m.0$. (*PPS*) $16^m.0$. e_N $19^m.1$. *SS* $21^m.9$.

No. 34. July 19. 1^h. East of Japan. First movement in *P* quite small, followed by increasing oscillations. *PP* 4^m45^s, *PPP* 6^m36^s. *S* 11^m40^s well defined; 11^m57^s on *E*, larger. *SS* $16^m.5$; *SSS* $20^m.3$. *L* not large.

No. 51. July 29. 7^h. Pacific Ocean; $\triangle$ = ca. 150°. Deep focus. *P'* 57^m33^s; the first movement small, the time not quite certain; the subsequent movement exceptionaly large. Later phases not very clearly marked. e_Z 59^m32^s, e_Z 60^m23^s; $e_{N,Z}$ 60^m57^s. e_N $63^m.1$, e_Z $63^m.5$. *e* $66^m.7$; $67^m.9$; $70^m.4$; $72^m.8$; $73^m.8$. *L* small.

No. 77. Aug. 17. 2^h. Pacific Ocean; $\triangle$ = ca. 150°. P'_Z 4^m5^s, in time mark; *i* 4^m13^s large on *Z*. *PP* 7^m28^s. e_N $8^m.6$. *SKKS* $14^m.2$ small. *SKSP* 17^m37^s. *PPS* 20^m4^s. *SS* 26.7, *SSS* $31^m.4$. First *L* waves large, of long period.

No. 116. Sept. 11. 14^h. Japan. *iP* 15^m35^s, condensation, very large; i_Z 15^m48^s. *PP* 18^m16^s; *PPP* 20^m2^s; *PPPP* 21^m8^s. *S* 25^m3^s (in time-break) very large, followed by large oscillations. e_N $28^m.5$; *e* 31^m.

No. 120. Sept. 15. 14^h. Pacific Ocean; $\triangle$ = ca. 135°. *P'* about $28^m.2$, quite small. *PKS* 31^m52^s, e_E 32^m47^s. *PPP* $33^m.7$; *SKS* 35^m20^s. *SS* $48^m.0$. *SSS* $53^m.3$.

No. 125. Sept. 19. 2^h. Pacific Ocean. 84^m—89^m waves of shorter period than those preceding and succeeding them. *L* of a different shock?

No. 126. Sept. 20. 2^h. New Guinea; $\triangle$ = ca. 115°. *P* quite small $1^m.6$. *PP* $6^m.1$, *e* 6^m32^s larger. *e* $7^m.5$. *PPP* $8^m.9$. *e* $11^m.4$. *e* $13^m.5$; $14^m.0$ large. *PS* 16^m4^s and *PPS* 17^m11^s large. *SS* $22^m.4$. e_N $24^m.8$, e_E $25^m.6$. *L* $33^m.5$, first waves very large, of long period.

No. 127. Sept. 20. 5^h. Pacific Ocean; $\triangle$ = ca. 115°. Small movement masked by microseisms, precedes *PP* 42^m43^s. e_E 44^m41^s. PPP_Z 45^m12^s. *SKS* 48^m34^s, (*SKKS*) $49^m.8$. *PS* 52^m14^s large. *SS* $58^m.8$.

No. 131. Sept. 23. 9^h. Pacific Ocean; $\triangle$ = ca. 115°. *PP* 37^m58^s preceded by small movement. *PPP* 40^m21^s. *SKS* 43^m50^s. *e* 45^m22^s. *PS* $46^m.4$. *e* $50^m.2$; $51^m.8$. *SS* $54^m.0$.

BIANCO LUNOS BOGTRYKKERI A/S
KØBENHAVN

No. 36. 1935.

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. 36. Oct.—Dec. 1935.

Instruments:

Galitzin-Wilip seismographs:

Constants:

Component	l	A_1	T_1	μ^2	T	k
	cm	cm	sec		sec	
N	12.5	100	12.61	—0.07	12.3	103
E	12.5	100	12.65	—0.05	12.0	103
Z	14.5	100	11.55	0.1	9	87

Wiechert 1000 kg. horizontal seismograph.

Wiechert 1300 kg. vertical seismograph.

Constants:

Component	T	v	ϱ	V
	sec		mm	
N	9.5	4.2	0.7	215
E	9.6	4.2	0.7	190
Z	5.6	4.0	0.1	165

Milne-Shaw seismograph, *E* component, with the approximate constants $T = 12^s$ $v = 20$ $V = 300$.

Wood-Anderson torsion seismometer, *E* component, $T = 2^s.7$.

København.

No.	Date	Hour	Forerunners P	Forerunners S			L	Un-defined	△	Remarks
	1935 Oct.		m s	m s	h m s	m s	h m	h m	°	
1	1	0					.6			
2	1	5					.9			
3	1	11					.8			
4	2	5	*i*44 31	*i*53 57	*i*44 42	44 56	1.1			*PPP* 49m.1. Kurile Islands.
5	4	15					.2			[Depth below normal.
6	4	21					.3			
7	4	23					.4			
8	5	14					9			Bosnia.
9	6	4			55.6	59.2				
10	6	5					.8			
11	6	15					14			
12	7	5	11 26		22.0		.7			*P* quite small, uncertain.
13	8	9	27.0	33 13	28 42	36 2*				*P* quite small, uncertain.
14	8	20					.9			[Mount Hissar region.
15	9	22	*i*13 8	16 46	14.7	16 39	17		20	SW of Iceland.
16	10	13					.4			
17	10	21					.0			
18	11	0					52			
19	11	4	28 2*	34 18	37.7				41	
20	11	22			35.6	45.2	1.1			*SS* 51m.4; *SSS* 56m.0.
										No G.Z record.
21	12	16	57.1	66 47	60.1	61.9	80		76	*SS* 71m.9. Japan. No G.Z record.
22	13	2					.6			Strong microseisms.
23	13	19					49			» »
24	14	10					38			
25	14	20					43			
26	15	20		51.0			54			
27	17	15					.3			NW of Spitsbergen.
28*	18*	0	23 45	33 26	26 37	38.1	47		76	South of Kurile Islands.
29	18	6					.5			
30*	18*	11	19		22.7	31.7	.9			Marianne Islands.
31	18	15	*i* 5 41	15 21	8 31	20.3	.5		76	Pacific Ocean. East of Japan.
32	18	22					.5			
33	19	5					22			Very strong microseisms.
34	21	11					13			
35	22	7	34				40			*P* quite small, uncertain.
36	23	13			46.1		1.2			
37	23	19					.7			
38	24	0					.8			
39	24	15					.5			
40	25	0			33		1.3			
41	25	18					.2			
42	26	21					40			
43	27	6		57.0			1.1			Small preceding movement.
44	28	12					30			Iran.
45	29	21					2			
46	30	2					.8			
47	31	19					.1			

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No.	Date	Hour	Forerunners P	Forerunners S			L	Un-defined	△	Remarks
	1935 Nov.		m s	m s	h m s	m s	h m	h m	°	
48	1	6	13 5	20 39	24 32		28			*P* not quite certain, masked by microseisms. Canada.
49*	1*	16	33 40	*i*43 9	43 46	48.0	58		74	Annam.
50	2	18					.6			
51	3	17					.1			
52	4	11					.0			
53	4	14					.8			
54	5	10					.5			Small preceding movement.
55	5	14					.1			
56	5	16					.8			
57	5	21			21 42		45			Celebes.
58	6	14					.0			
59	6	22			14		.6			Small preceding movement.
60	7	4		44 8			46			Faint preceding movement, *P* not readable. Yogoslavia. △ = ca. 16°.
61	7	11					10			
62	7	21			19.1	26.1	32			
63	10	18	38 41	47 38	48 34	52.1	56			*P* small, not quite certain.
64	11	13			38		1.2			[*SSS* 55m. Lesser Antilles.
65	12	21	40.7				1.2			Sumatra region. *P* quite small,
66	14	0					32			[not certain.
67	14	20			17.0	24.3	.9			*PS* 26m.7. *SS* 33m.7. *SSS* 38m.1.
68	16	0					.5			[North of Solomon Islands.
69	16	6					.7			
70	17	8			0.6	22.3	.7			
71	17	15					.2			
72	19	7					.6			
73	22	12					.3			
74	23	8			16.4	22.4	.5			Off Ecuador.
75	25	4					.7			Faint.
76	25	10	15 14	25 20	16.0	26.2			81	Sumatra. *SSS* 33m.9. Possibly a small earlier beginning of *P*.
77	26	19					.5			Strong microseisms.
78	30	3	52.4	62 34	68.2		1.3			*P* small, uncertain. No Galitzin records.
	Dec.									
79	2	0					26			
80	2	17					.4			
81	5	18					.8			Small preceding movement masked
82	8	16					13			[by microseisms.
83	8	23					.2			
84	9	7			59		1.8			Masked by microseisms.
85	9	16						.4		Faint.
86	11	9					26			
87	11	12						33		
88*	14*	1	43 28	*i*53 6	45 43	*i*53 47				Peru. Deep focus.
89	14	12					.8			
90	14	13	0 14		10 18	10 47				*PS* 12m3s. *SS* 17m.0. *L* small.
91*	14*	22	18 3*		21 27	34.2	.7			Mexico.

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No.	Date	Hour	Forerunners P	Forerunners S	L	Undefined	△	Remarks
	1935 Dec.		m s	m s	h m	h m	°	
92	15	2			.5			
93*	15*	7		27.1 29.1	1.0			Solomon Islands.
94	16	17		21.2 23 36				*e* 30m.0. Masked by microseisms.
95	17	13			1.3			Small preceding movement.
96	17	19	30 3*	33 26 *i*40 27	.9			*e* 41m.3. *SS* 45m.8. E of Formosa.
97	17	22		56 52	1.3			
98	18	7	21 30	*i*30 32	.7		69	China.
99	18	8			.7			Superposed on preceding shock.
100	18	12			33			
101	18	13			50			
102	18	17	10 25	19 25	33		68	China.
103	18	21			.7			
104	19	10			.3			
105	19	14			.0			
106	19	21			57			
107	19	23	18 30	21 22 28.2				
108	20	0			22			
109	20	0			.7			
110	20	6			.5			
111	20	8			27			
112	20	18		58 3 63.2	1.6			e_E 65m.0; 78m.1. Pacific Ocean.
113	21	5		51.1	1.2			
114	21	8			.1			
115	21	12	3 53	14 28	32			
116	22	4			.2			
117	22	10			.8			
118	22	12		49.0	1.2			
119	22	16			8			
120	22	20				.8		Faint.
121	23	14		63 54	76			
122	24	12	37 5	47 56 48 33	1.1			Deeper than normal.
123*	28*	2	48 14	*i*59 6 51.7 64.5	1.2			Sumatra.
124	28	18			.2			Small preceding movement.
125	28	19			.6			
126	29	4		3 30 9	.5			
127*	29*	23		55.8 63.3	1.5			New Guinea.
128	30	1			52			Superposed on preceding shock.
129	30	5			.0			
130	31	2			.4			

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NOTES

No. 28. Oct. 18. 0h. South of Kurile Islands. *P* not quite certain, masked by microseisms. *PP* 26m37s; *PPP* 28m22s. On *E* small beginning of *S* 33m15s or 22s, stronger movement 38s. S_N 33m26s well defined. *S* succeeded by oscillations lasting about 2 min., probably *PS* and S_cS, but phases not distinct. *SS* 38m.1.

No. 30. Oct. 18. 11h. Marianne Islands; △ = ca. 100°. Masked by strong microseisms. *P* quite small, uncertain, about 19m. *PP* 22m.7. *SKS* 29m.2; (*S*) 30m.8. *PS* 31m.7; *PPS* 32m.8. e_N 35m.3. *SS* 37m.8.

No. 49. Nov. 1. 16h. Annam. *P* small. PPP_E 38m.2. iS_N 43m9s rather large, well defined. S_E small, not clearly marked, possibly earlier. PS_N 43m46s. *SS* 48m.0 rather large, preceded by smaller oscillations. *SSS* 50m.9; 51m34s larger.

No. 88. Dec. 14. 1h. Peru; △ = ca. 90°. Deep focus. The beginning of *P* somewhat uncertain. e_Z 45m43s; 46m48s; 47m.4. $e_{E,Z}$ 50m26s. *iSKS* 53m6s large; *i*(*S*) 53m47s. e_E 55m3s (in time mark) large and followed by large oscillations. *i* 58m51s. *e* 60m.3. e_N 62m18s. i_E 63m54s large. *L* small.

No. 91. Dec. 14. 22h. Mexico; △ = ca. 85°. *P*, condensation, large. e_Z 20m.7. *PP* 21m27s. e_E 28m.0. *i*(*SKS*) 28m33s; e_E 28m.8 larger. *e* 32m.2. *SS* 34m.2.

No. 93. Dec. 15. 7h. Solomon Islands; △ = ca. 130°. Phases not clearly marked. P'_Z 27m.1; P'_E 27m.7. *PP* 29.m1. e_E 29m42s; e_E 30m.5, followed by continued oscillations. (*PS*) 40m.5. *SS* 46m.3.

No. 123. Dec. 28. 2h. Sumatra; △ = ca. 90°. *eP*, condensation; first movement small; increasing, strong oscillations. *PP* 51m.7. e_E 55m.5, large waves of long period. e_E 58m.2. $(SKS)_N$ 58m53s. *iS* 59m6s, very large on *N*. *SS* 64m.5; *SSS* 68m.2. e_N (*L*) 71m.5.

No. 127. Dec. 29. 23h. New Guinea; △ = ca. 110°. *PP* 55m.8, not clearly marked; faint preceding movement masked by microseisms. *PPP* 58m.7. (*SKS*) 62m.2; *e* 63m.3. (*PS*) 64m.9. *SS* 71m.3; *SSS* 76m.3.