

27. *Tilt Observations during the Recent Activities of Volcano Asama.*

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1. *Introduction.* It has become evident from tilt observations made at Kilauea¹⁾ and Asama that a volcano eruption is usually preceded by tilts of its flanks. We have already reported in this Bulletin²⁾ the remarkable tilts of the ground observed in the case of Asama's activities in 1932 and 1935.

After the activities in 1935 had stopped, we established a new tiltmeter station in the "Oni no Osidasi", the lava stream of 1783, the new station being thus 5 km north of the crater. Since then tilt observations have been continued at three stations, namely Komoro, the Asama Volcano Observatory, and Osidasi. Komoro is 12 km SW of the crater, and the Asama Volcano Observatory 4 km E of the crater. At Osidasi and the Volcano Observatory the tiltmeter is installed in a deep cave excavated in the natural rock, which seems most suitable for this sort of observation, particularly as the air temperature in the cave is quite free from annual variations, being below 0°C even in summer.

As to the activities of the volcano. those of 1935, which began in April, ended in November, after which the volcano, which was very quiet until the end of February, 1936, became active again, resulting in a number of explosions of varying severity during July and August of that year. The present report describes these explosions and the tilts of the ground observed at the stations just mentioned during these active periods.

2. *The eruptions in 1936.* In the following table are given the dates and the severity of all the eruptions that occurred in 1936, classified, as in previous reports, into four groups, A, B, C, D, according to magnitude. A denotes a violent explosion with strong detonation and projection of numerous volcanic bombs, small fragmental lavas, and

1) T. A. JAGGAR and R. H. FINCH, *Bull. Scis. Soc. Amer.*, 19 (1929), 38.

2) R. TAKAHASI, *Bull. Earthq. Res. Inst.*, 11 (1933), 25.

T. MINAKAMI, *ibid.*, 13 (1935), 629.

ashes, the earth-shaking and air vibrations being sensible as far as 100 km from the crater. B denotes an explosion with strong detonation, also with projection of volcanic bombs and ashes, but to a smaller degree than A. The earth-shaking and air vibrations are felt up to 50 km of the volcano. C is an explosion, with or without detonation, with projection of small bombs, fragmental material and ashes; the earth-shaking being sensible only to seismographs and there is no air

Table I.

No.	Class	Date	Time of Occurrence	No.	Class	Date	Time of Occurrence
			h m				h m
1	A	Feb. 7	1 47 p.m.	31	D	July 19	2 40 a.m.
2	D	8	8 15 a.m.	32	D	19	5 40 a.m.
3	D	8	9 37 a.m.	33	D	20	8 05 a.m.
4	D	9	6 55 p.m.	34	D	20	8 15 a.m.
5	C	10	10 03 a.m.	35	C	20	9 40 a.m.
6	D	11	11 54 a.m.	36	C	20	10 10 a.m.
7	D	12	1 44 p.m.	37	D	21	6 40 a.m.
8	C	12	2 p.m.	38	C	21	9 50 a.m.
9	D	13	6 45 p.m.	39	C	22	9 24 p.m.
10	A	15	3 55 p.m.	40	A	23	1 30 a.m.
11	D	16	0 35 p.m.	41	D	23	6 10 a.m.
12	D	17	3 22 p.m.	42	C	24	1 40 p.m.
13	D	22	0 55 p.m.	43	D	25	5 45 a.m.
14	D	Mar. 3	9 22 a.m.	44	D	25	8 05 a.m.
15	B	6	4 10 p.m.	45	D	25	9 25 a.m.
16	A	7	10 30 a.m.	46	D	25	2 44 p.m.
17	C	7	0 41 p.m.	47	D	25	4 42 p.m.
18	D	23	0 15 p.m.	48	D	26	8 20 a.m.
19	C	Apr. 20	1 21 a.m.	49	D	26	9 00 a.m.
20	C	23	8 16 a.m.	50	D	26	4 36 p.m.
21	D	24	11 23 a.m.	51	C	27	1 00 a.m.
22	D	24	1 32 p.m.	52	C	27	5 26 a.m.
23	D	June 23	4 p.m.	53	D	27	10 30 a.m.
24	D	July 1	5 a.m.	54	D	28	0 20 p.m.
25	D	4	4 20 p.m.	55	D	28	2 10 p.m.
26	D	10	7 a.m.	56	B	29	9 12 a.m.
27	D	10	7 30 a.m.	57	D	29	9 29 a.m.
28	D	14	10 a.m.	58	D	29	11 00 a.m.
29	D	15	8 30 a.m.	59	B	Aug. 4	4 18 a.m.
30	D	17	4 30 a.m.	60	D	4	5 23 a.m.

(to be continued.)

Table I. (Continued.)

No.	Class	Date	Time of Occurrence	No.	Class	Date	Time of Occurrence
			h m				h m
61	D	Aug. 11	9 55 a.m.	68	D	Oct. 6	7 10 p.m.
62	D	16	5 37 p.m.	69	D	7	3 40 p.m.
63	D	16	5 56 a.m.	70	D	10	5 55 p.m.
64	C	Sept. 19	6 16 p.m.	71	C	15	7 28 a.m.
65	C	20	7 30 p.m.	72	B	17	9 34 a.m.
66	D	21	8 00 a.m.	73	C	Nov. 4	2 20 p.m.
67	C	Oct. 1	10 30 a.m.	74	C	5	4 17 p.m.

vibration. D is a small non-detonating eruption with projection of only volcanic gravels and ashes, with or without volcanic tremors.

3. *Tilt observations.* The readings of the tiltmeter records obtained at the three stations are given in Table II. These readings were taken from continuous photographic records for times corresponding to 0^h, 6^h, 12^h, and 18^h each day. In the table will also be found the air temperature at noon each day as observed at the Volcano Observatory.

Although owing to many difficulties, the observation at Osidasii often had to be dispensed with in the winter months, the general tendency of the tilts could still be known.

Table II. A-a.

E-W Component of Tilting at the Volcano Observatory.

Unit=0".05

The increases in readings indicate tilt of the ground in the sense of E downward.

Date	Time	0 ^h	6 ^h	12 ^h	18 ^h	Date	Time	0 ^h	6 ^h	12 ^h	18 ^h
2	-36.0	-35.5	-34.0	-34.0	15	-26.0	-31.0	-21.0	-16.0		
3	-39.0	-41.5	-42.5	-43.0	16	-15.0	-20.0	- 6.0	+ 7.0		
4	-42.0				17	+17.0	+11.0	+21.5			
5	-40.0	-32.5	-28.0	-31.5	18		+45.0	+49.5	+58.0		
6	-39.0	-40.0	-40.5	-44.5	19	+62.0	+51.0	+63.0	+69.0		
7	-51.0	-55.0	-62.0	-68.0	20	+62.0	+49.0	+51.0	+58.0		
8	-78.0				21	+69.0					
9					22						
10					23		+17.0	+23.0	+33.5		
11	-30.0	-27.0	-24.5	-22.0	24	+25.0	+ 9.0	+11.5	+21.5		
12	-26.0	-36.0	-32.0	-29.0	25	+24.0	+ 7.5	+ 7.0	+ 3.0		
13	-37.0	-48.0	-48.0	-47.0	26	- 5.0	-28.0	-46.0	-54.0		

(to be continued.)

Table II. (Continued.)

Time Date	0 ^h	6 ^h	12 ^h	18 ^h	Time Date	0 ^h	6 ^h	12 ^h	18 ^h
Jan. 27	-54.0			-54.0	Mar. 8	+10.5	0	0	+ 1.0
28	-52.0	-44.0	-26.0	- 8.0	9	- 5.0	-12.0	-19.0	-19.0
29	- 9.0	-31.0	-40.0	-47.0	10	-22.0	-23.5	-14.0	- 8.0
30	-54.0	-64.0	-69.0	-62.0	11	- 8.0	-10.0	+ 2.0	+11.0
31	-56.5	-50.0	-31.0	- 9.0	12	+ 7.0	- 3.0	- 8.0	- 8.0
Feb. 1		+22.5	+26.0	+28.5	13	-17.0	-25.0	-33.0	-42.0
2	+32.5	+37.5	+47.0	+46.0	14	-49.0	-54.5		
3	+47.0	+38.0	+42.5	+42.0	15	-14.0	-18.0	-22.5	-26.0
4	+41.0	+30.0	+30.0	+34.0	16	-27.0	-30.0	-27.0	-22.5
5	+31.0	+15.0	+ 5.0	+ 4.0	17	-17.0	-24.0	-26.0	-27.0
6	+ 2.0	- 5.5	- 3.0	+ 1.5	18	-27.0	-29.0	-32.0	-35.0
7	+ 3.0	- 6.5	- 8.0	- 6.5	19	-36.5	-40.0	-39.0	-35.0
8	- 5.0	-13.0	-20.5	-24.5	20	-28.0	-32.0	-28.0	-20.0
9	-28.0	-36.0			21	-25.0	-28.5	-32.0	-34.0
10		-25.0	-22.0	-18.0	22	-36.0	-39.5	-40.0	-36.0
11	-22.0	-27.0	-26.0	-19.0	23	-34.0	-41.0	-43.0	-42.0
12	-22.0	-25.0	-17.5	-13.0	24	-41.5	-46.0	-46.0	-47.0
13	-14.0	-15.5	- 1.5	+12.0	25	-48.0	-49.0	-51.0	-50.5
14	+ 4.0	- 4.0	- 1.5	- 1.5	26	-48.5	-49.0	-45.5	-42.0
15	- 9.0	-20.0	-16.0	-11.0	27	-36.0	-40.0	-37.5	-33.5
16	-11.0	-20.0	-17.0	-14.0	28	-38.0	-40.5	-44.0	-47.0
17	-14.0	-26.0	-28.0	-31.0	29	-48.0	-50.0	-51.0	-52.0
18	-36.0	-42.0	-49.0	-54.5	30	-52.0	-54.0	-55.0	-52.5
19	-58.0	-63.0	-63.0	-59.0	31	-46.0	-44.0	-35.0	-28.0
20	-55.0	-62.0	-56.0	-48.0	Apr. 1	-34.0	-37.0	-33.0	-27.0
21	-45.0	-54.0	-45.0	-36.0	2	-28.0	-36.0	-36.0	-31.5
22	-30.0	-29.0	-17.5	- 7.0	3	-34.0	-41.0	-43.0	-47.0
23	-13.5	-18.0	-13.0	-16.0	4	-49.0	-51.5	-54.0	-53.0
24	-22.0	-31.0	-32.0	-25.5	5	-50.0	-53.0	-47.0	-41.5
25	-31.5	-38.0	-39.0	-31.5	6	-45.0	-50.5	-52.5	-54.5
26	-31.5	-29.0	-18.5	-13.0	7	-50.5	-55.0	-57.0	-59.0
27	-14.0	-23.0	-20.0	-11.0	8	-60.0	-61.0	-63.5	-64.0
28	-22.0				9	-65.0	-66.0	-67.0	-68.5
29					10	-69.0	-67.0	-68.0	-69.0
					11	-70.0	-70.0	-70.0	-69.0
					12	-68.0	-69.0	-70.5	-70.0
					13	-70.0	-71.0	-72.0	-72.5
Mar. 6		+10.0	+19.5	+25.0	14	-73.0	-74.0	-75.0	-76.0
7	+17.0	+ 7.0	+12.0	+17.0	15	-75.0	-75.5	-76.0	-75.0

(to be continued.)

Table II. (Continued.)

Time Date	0 ^h	6 ^h	12 ^h	18 ^h	Time Date	0 ^h	6 ^h	12 ^h	18 ^h
Apr. 16	-75.5	-75.5	-76.0	-77.0	May 25		+13.5	+16.0	+18.5
17	-77.5	-78.0	-78.0	-78.0	26	+21.0	+25.0	+30.0	+34.0
18	-77.0	-77.0	-77.5	-78.0	27				
19	-77.0	-77.0	-77.0	-78.0	28	+28.0	+27.0	+27.5	+27.5
20	-78.0	-78.0	-78.0	-77.0	29	+27.5	+29.5	+29.0	+27.5
21	-77.0	-77.0	-76.5	-76.5	30	+31.0	+30.5	+29.0	+27.5
22	-76.0	-76.0	-77.0	-78.0	31	+25.5	+24.5	+24.5	+24.0
23	-78.0	-77.5	-75.5	-79.5	Jnne 1	+22.0	+14.0	+13.0	+10.5
24	-79.0	-78.0	-76.0	-75.5	2	+7.5	+2.5	-2.5	-4.5
25	-76.0	-77.0	-78.5	-79.0	3	-8.0			
26	-79.0	-80.0	-80.5	-80.0	4				
27	-81.0	-82.0	-82.0	-81.0	5				
28	-80.0	-80.0	-80.0	-80.0	6				-14.0
29	-81.0	-82.0	-83.0	-83.0	7	-13.5	-12.5	-15.0	-16.0
30	-82.5	-83.5	-83.5	-84.0	8	-15.0	-12.5	-11.5	-11.0
May 1	-84.0	-84.0	-85.0	-85.0	9	-10.0	-8.0	-7.0	-6.0
2	-86.0	-86.0	-85.0	-83.5	10	-5.0	-4.5	-4.5	-4.5
3	-83.0	-83.0	-83.0	-84.0	11	-4.0	-5.0	-8.5	-11.0
4	-83.0	-82.0	-83.0	-83.0	12	-11.0	-10.0	-11.5	-8.5
5	-82.0	-82.0	-82.5	-82.5	13	-7.0	-7.0	-5.0	
6	-82.0	-81.0	-82.0	-83.0	14			-4.0	-3.5
7	-82.0	-82.0	-83.0	-84.0	15	-3.0	-2.5	-2.5	-2.0
8	-84.0	-86.0	-85.0	-83.0	16	-2.0	-1.0	0.0	0.0
9	-82.0	-82.0	-83.0	-83.0	17	+0.5	+1.0	+1.5	+2.0
10	-82.0	-81.5	-82.0	-82.5	18	+2.0	+3.5	+4.0	+4.0
11	-81.5	-79.0	-79.0	-78.5	19	+4.5	+4.0	+4.0	+5.0
12	-77.0	-76.0	-75.0	-72.0	20	+6.5	+7.5	+7.0	+7.0
13	-71.0	-70.5	-70.0	-68.5	21	+8.0	+8.5	+10.0	+11.0
14	-67.0	-67.0	-66.0	-65.0	22	+11.0	+11.5	+12.0	+12.0
15	-64.0	-62.0	-61.0	-60.0	23	+12.0	+13.0	+13.0	+14.0
16	-58.5	-56.5	-55.0	-53.0	24	+14.0	+15.0	+15.5	+15.5
17	-52.0	-50.0	-49.0	-47.0	25	+16.5	+17.0	+18.0	+18.0
18	-44.0	-44.5	-45.0	-43.0	26	+18.0	+18.5	+19.0	+19.5
19	-39.0	-36.0	-33.0	-31.0	27	+20.5	+21.0	+21.0	+21.0
20	-29.0	-26.5	-25.0	-22.0	28	+20.5	+20.5	+21.5	+22.0
21	-19.0	-18.0	-18.0	-16.0	29	+22.0	+22.0	+22.0	+22.0
22	-12.0	-10.0	-8.0	-6.0	30	+23.0	+19.0	+19.0	+18.5
23	-3.0				July 1	+19.0	+18.5	+18.5	+18.5
24					2	+18.0	+18.0	+22.0	+22.0

(to be continued.)

Table II. (Continued.)

Time		0 ^h	6 ^h	12 ^h	18 ^h	Time		0 ^h	6 ^h	12 ^h	18 ^h
Date						Date					
July	3	+22.0	+21.0	+21.0	+21.0	Aug,	11	+80.5	+80.5	+81.0	+83.0
	4	+21.0	+21.0	+20.5	+20.0		12	+83.5	+83.5	+85.0	+87.0
	5	+20.0	+22.0	+23.0	+24.0		13	+87.0	+88.0	+88.0	+88.5
	6	+24.5	+25.5	+24.5	+24.5		14	+89.0	+89.0	+90.0	+89.0
	7	+24.5	+25.0	+25.5	+25.5		15	+88.5	+89.0	+89.0	+89.0
	8	+25.5	+26.0	+27.0	+28.0		16	+89.5	+91.0	+92.0	+92.0
	9	+28.0	+28.0	+28.5	+29.0		17	+92.0	+91.0	+91.0	+91.5
	10	+29.0	+29.0	+30.0	+32.0		18	+91.5	+91.0	+90.0	+90.0
	11	+32.5	+32.5	+33.5	+35.0		19	+90.0	+90.0	+89.5	+89.0
	12	+37.0	+38.0	+38.0	+38.5		20	+89.0	+89.5	+90.0	+90.0
	13	+38.5	+38.0	+38.5	+40.0		21	+89.5	+89.0	+89.0	+89.5
	14	+41.0	+41.0	+41.5			22	+90.0	+89.5	+90.0	+90.0
	15						23	+89.5	+89.0	+89.0	+88.5
	16				+52.0		24	+89.0			
	17	+52.0	+53.0	+53.0	+53.0		25				
	18	+53.0	+52.0	+52.0	+53.0		26				
	19	+52.0	+52.0	+52.0	+52.5		27				
	20	+52.0	+51.0	+50.5	+50.0		28				
	21	+51.0	+51.0	+50.5	+50.5		29	+92.5	+92.5	+92.0	+92.0
	22	+51.0	+52.0	+52.0	+51.5		30	+92.0	+92.0	+93.0	+93.0
	23	+52.0	+52.0	+52.0	+52.0		31	+93.0	+92.0	+92.0	+93.0
	24	+52.0	+51.5	+51.0	+50.0	Sept.	1	+92.0	+92.0	+92.0	+92.0
	25	+50.0	+50.5	+52.0	+52.0		2	+92.0	+91.5	+92.0	+92.0
	26	+50.0	+51.0	+51.0	+52.0		3	+92.0	+92.0	+92.0	+92.0
	27	+52.0	+53.0	+51.0	+53.0		4	+92.0	+91.0	+91.0	+90.5
	28	+53.0	+54.0	+55.0	+56.0		5	+91.0	+91.0	+90.0	+90.0
	29	+57.0	+57.0	+57.0	+58.0		6	+90.0	+90.5	+91.0	+91.0
	30	+58.0	+58.0	+58.0	+59.0		7	+91.0	+90.5	+90.0	
	31	+60.0	+60.0	+61.0	+62.0		8			+88.0	+88.0
Aug.	1	+62.0	+63.0	+63.0	+64.0		9	+89.0	+91.0	+90.5	+91.0
	2	+59.0	+59.0	+58.0	+60.0		10	+91.5	+91.0	+91.0	+91.0
	3	+61.0	+63.0	+64.0	+63.5		11	+91.0	+91.0	+90.5	+91.0
	4	+64.5	+65.0	+64.0	+65.0		12	+91.0	+91.0	+90.5	+90.5
	5	+66.5	+68.0	+68.0	+68.0		13	+91.0	+91.0	+91.0	+90.0
	6	+69.0	+70.5	+71.5	+72.0		14	+90.0	+90.0	+90.0	+90.0
	7	+72.5	+72.5	+72.5	+72.5		15	+90.5	+90.5	+90.0	+90.0
	8	+73.0	+73.0	+74.5	+75.0		16	+89.5	+89.0	+89.0	+89.0
	9	+77.0	+77.0	+77.0	+78.0		17	+89.0	+89.0	+89.0	+89.0
	10	+78.0	+78.5	+79.5	+80.0		18	+87.0	+86.5	+86.5	+87.0

(to be continued.)

Table II. (Continued.)

Time		0 ^h	6 ^h	12 ^h	18 ^h	Time		0 ^h	6 ^h	12 ^h	18 ^h
Date						Date					
Sept. 19		+87.0	+85.5	+85.0	+86.0	Oct. 11	+78.0	+78.0	+77.0	+78.0	
20		+86.0	+86.0	+85.0	+85.0	12	+78.0	+76.5	+76.0	+76.5	
21		+85.0	+85.0	+84.0	+84.0	13	+77.0	+77.0	+77.0	+79.0	
22		+84.0	+84.0	+84.0	+84.0	14	+80.5	+81.0	+78.0	+76.5	
23		+84.0	+84.0	+84.0	+84.0	15	+76.5	+75.5			
24		+83.5	+82.0	+82.0	+85.0	16					
25		+84.0	+84.0	+84.0	+84.0	17			+77.5	+78.5	
26		+83.5	+83.5	+82.5	+82.0	18	+79.0	+79.0	+79.0	+78.0	
27		+82.0	+82.0	+82.5	+82.5	19	+76.5	+76.0	+76.0	+76.0	
28		+83.0	+83.0	+83.0	+83.5	20	+77.0	+77.5	+77.0	+76.5	
29		+83.0	+82.5	+83.0	+83.0	21	+75.0	+76.5	+78.0	+78.5	
30		+83.0	+82.0	+82.0	+82.0	22	+78.0	+77.0	+76.5	+77.0	
Oct. 1		+81.0	+80.0	+80.0	+80.0	23	+79.0	+84.0	+87.0	+88.0	
2		+79.5	+78.5	+78.5	+78.5	24	+87.0	+88.5	+89.0	+85.5	
3		+77.0	+77.5	+78.0	+79.0	25	+85.0	+85.0	+84.0	+83.0	
4		+79.0	+79.5	+81.0	+82.5	26	+80.0	+78.0	+78.0	+77.0	
5		+83.0	+83.0	+81.5	+82.0	27	+76.0	+76.0	+78.0	+77.5	
6		+83.0	+82.0	+81.0	+81.0	28	+81.0	+85.0	+85.0	+84.0	
7		+81.5	+81.5	+81.0	+82.0	29	+82.0	+81.0	+80.5	+80.5	
8		+82.0	+81.0	+79.0	+78.0	30	+79.0	+78.0	+77.5	+78.0	
9		+80.0	+79.0	+76.0	+77.0	31	+77.0	+76.0	+76.5	+77.0	
10		+78.0	+77.0	+77.0	+77.0						

Table II. A-b.

N-S Component of Tilting at the Volcano Observatory.

Unit=0".05

The increases in readings indicate tilt of the ground in the sense of S downward.

Time		0 ^h	6 ^h	12 ^h	18 ^h	Time		0 ^h	6 ^h	12 ^h	18 ^h
Date						Date					
Jan. 1		-11.0	-10.5	-6.0	-12.0	Jan. 9					
2		-14.0	-8.0	-2.0	-3.5	10					
3		-4.5	-1.0	+1.0	+1.0	11					
4		+1.0	+1.0			12				-31.5	-40.5
5			0.0	-14.0	-20.0	13	-52.0	-43.0	-52.5	-61.5	
6		-15.0	+4.0	-11.0	-22.0	14		-30.0	-45.0	-49.0	
7		-30.0	-36.0	-50.0	-54.0	15	-40.0	-10.0	-18.0	-26.0	
8		-52.5	-50.0			16	-26.0	-16.0	-28.0	-19.0	

(to be continued.)

Table II. (Continued.)

Time		0 ^h	6 ^h	12 ^h	18 ^h	Time		0 ^h	6 ^h	12 ^h	18 ^h
Date	Date										
Jan. 17	- 8.0	+ 2.5	+ 3.0	+ 8.0	Feb. 25	+ 1.0	- 2.5	- 5.0	- 9.0		
18	+17.0	+10.0	+18.0		26	-19.0	-10.0	+ 5.0	+14.0		
19			+26.0	+26.0	27	+12.0	+16.0	+16.0	+ 6.0		
20	+28.5	+41.5	+42.0	+41.0	28	0.0	+ 5.0	+ 9.0	+ 8.0		
21	+33.0	+35.0	+27.0	+29.0	29	- 1.0	-14.0	-13.5	-10.5		
22	+37.0	+51.0	+47.0	+39.0	Mar. 1	-20.0	-11.0	- 8.5	+ 7.0		
23	+37.0	+48.0	+49.0	+41.0	2	+ 5.0	+15.0	+15.0	+11.0		
24	+41.0	+54.0	+54.0	+47.0	3	+ 4.5	+16.0	+17.0	+15.0		
25	+44.0	+55.0	+53.5	+56.0	4	+ 2.5	+10.0	+10.0	+ 6.5		
26	+57.0	+43.5	+22.0	+11.0	5	+ 1.0	+10.0	- 2.0	+ 7.0		
27	+ 4.0	-13.0	- 7.0	- 6.0	6	+12.0	+23.0	+18.0	+17.0		
28	+ 3.0	+10.0	+20.0	+31.0	7	+23.0	+26.0	+21.0	+16.0		
29	+40.0			+36.0	8	+18.0	+22.0	+22.0	+19.5		
30	+23.5	+ 7.5	+ 5.0	+ 9.0	9	+ 9.5	- 3.0	- 9.5	- 9.5		
31	+ 8.5	+ 8.0	+34.0		10	-18.0	-13.0	-18.0	- 9.0		
Feb. 1		+22.0	+35.0		11	-13.0	- 2.0	+ 2.0	+ 8.0		
2		+33.5	+29.0	+35.0	12	+ 6.5	- 2.0	- 4.0	- 8.0		
3	+37.0	+47.5	+44.5	+48.0	13	-20.0	-31.0	-45.0	-55.0		
4	+45.0	+53.0	+57.0	+61.0	14	-60.5					
5	+55.0	+52.0	+48.0	+44.0	15	0.0	- 7.0	-15.0	-21.5		
6	+25.0	+20.5	+22.0	+23.0	16	-23.0	-27.0	-25.5	-23.5		
7	+16.0	+18.0	+24.0	+27.0	17	-18.0	-20.0	-20.0	-19.0		
8	+18.0	+11.0	+ 6.5	+ 3.0	18						
9	- 2.0				19	-43.0	-51.0	-60.0	-50.0		
10		-15.0	-17.0	-12.0	20	-42.0	-33.0	-23.0	-23.0		
11	-18.0	-18.0	-15.5	-12.5	21	-21.0	-15.5	-18.0	-22.0		
12	-16.0	- 8.0	- 7.0	+10.5	22	-28.0	-34.5	-37.0	-41.0		
13	+12.0	+17.0	+11.0	+25.0	23	-46.0	-46.0	-47.0	-47.5		
14	+21.0	+27.0	+27.0	+27.0	24	-51.5	-53.0	-58.0	-62.0		
15	+21.0	+12.0	+16.5	+15.0	25	-64.0	-70.5	-77.0	-80.0		
16	+ 5.5	+11.0	+14.0	+13.0	26	-81.5	-74.0	-73.0	-61.0		
17	- 1.0	- 1.5	- 4.5	- 8.0	27	-53.0	-42.0	-34.0	-29.0		
18	- 4.0	-10.0	-20.5	-33.5	28	-28.0	-30.0	-34.0	-39.0		
19					29	-41.0	-50.5	-57.0	-60.0		
20	-13.0	- 1.5	+ 1.5	+11.0	30	-62.0	-66.0	-69.5	-78.0		
21	+14.0	+26.0	+38.0		31	-76.0	-69.0	-41.0	-26.0		
22		+28.5	+47.0	+62.0	Apr. 1	-16.0	-15.0	-11.0	-10.5		
23		+37.0	+37.0	+35.0	2	-10.5	- 8.0	- 7.0	- 6.0		
24	+25.0	+15.5	+13.5	+ 7.5	3	- 2.0	-23.5	-33.0	-39.0		

(to be continued.)

Table II. (Continued.)

Time Date	0 ^h	6 ^h	12 ^h	18 ^h	Time Date	0 ^h	6 ^h	12 ^h	18 ^h
Apr. 4	-48.0	-54.0	-54.0	-44.0	May 13	-199.0	-197.0	-195.5	-194.0
5	-33.0	-21.0	-27.0	-15.0	14	-194.0	-193.0	-190.0	-190.0
6	-10.0	-11.5	-15.0	-14.0	15	-189.0	-187.0	-186.0	-183.0
7	-19.5	-26.0	-28.0	-32.0	16	-182.0	-181.0	-178.0	-176.5
8	-37.0	-41.0	-41.0	-45.0	17	-175.0	-173.0	-171.0	-170.0
9	-48.0	-54.0	-58.0	-62.0	18	-167.0	-163.0	-159.0	-156.0
10	-67.0	-69.0	-68.0	-71.5	19	-157.0	-156.5	-156.0	-155.0
11	-77.0	-78.0	-83.0	-89.0	20	-153.0	-152.0	-152.0	-152.0
12	-94.0	-86.0	-84.0	-86.0	21	-150.0	-145.0	-142.0	-140.0
13	-88.0	-89.0	-91.5	-92.0	22	-140.0	-140.0	-140.0	-140.0
14	-92.0	-92.5	-92.0	-95.0	23	-140.0	-139.0	-137.5	-137.0
15	-97.0	-96.0	-97.0	-100.0	24	-137.0	-135.0	-133.5	-132.0
16	-102.0	-103.0	-104.0	-107.0					
17	-106.0	-110.0	-114.0	-115.0					
18	-113.0	-115.0	-116.0	-119.0					
19	-121.5	-122.0	-124.0	-127.0	June 7		-42.0	-42.0	-24.0
20	-131.0	-133.0	-135.0	-139.0	8	-35.0	-29.0	-29.0	-33.0
21	-142.5	-142.0	-145.0	-148.0	9	-33.0	-34.0	-36.0	-34.0
22	-149.0	-150.0	-153.0	-157.0	10	-34.5	-34.0	-35.0	-36.0
23	-159.0	-160.0	-161.0	-160.0	11	-35.5	-35.0	-36.0	-36.0
24	-159.0	-164.0	-171.0	-174.0	12	-36.0	-36.0	-36.0	-37.0
25	-173.0	-173.0	-173.0	-173.0	13	-37.0			
26	-179.0	-179.0	-176.0	-181.0	14		-29.0	-27.0	-28.0
27	-178.0	-177.0	-180.0	-182.0	15	-28.5	-28.5	-28.0	-28.0
28	-186.0	-189.0	-189.0	-188.0	16	-27.0	-27.0	-26.0	-26.0
29	-190.0	-188.5	-188.0	-189.0	17	-26.0	-25.0	-25.0	-24.0
30	-191.0	-191.0	-193.0	-195.0	18	-24.0	-23.5	-22.5	-21.0
May 1	-198.0	-198.0	-197.0	-199.0	19	-20.5	-20.0	-19.5	-18.0
2	-197.0	-197.5	-200.0	-204.0	20	-17.0	-14.5	-14.0	-13.5
3	-206.0	-206.0	-206.0	-206.0	21	-12.0	-12.0	-11.0	-11.0
4	-207.0	-206.5	-205.5	-206.5	22	-10.5	-10.5	-8.0	-8.0
5	-208.0	-205.5	-206.0	-207.0	23	-8.0	-7.0	-6.0	-5.0
6	-211.0	-209.0	-209.0	-210.0	24	-5.0	-4.0	-3.0	-2.0
7	-224.0	-210.0	-209.0	-207.5	25	+1.0	+3.0	+5.5	+5.5
8	-206.5	-215.0	-205.5	-209.0	26	+6.0	+7.0	+8.0	+8.5
9	-209.0	-205.5	-204.0	-206.0	27	+10.0	+11.0	+11.5	+13.0
10	-206.0	-204.0	-201.0	-202.0	28	+15.0	+20.0	+21.0	+23.0
11	-203.0	-203.0	-202.0	-203.0	29	+24.0	+25.5	+25.5	+26.0
12	-204.0	-201.0	-198.0	-198.0	30	+27.0	+28.0	+29.5	+29.5

(to be continued.)

Table II. (Continued.)

Time		0 ^h	6 ^h	12 ^h	18 ^h	Time		0 ^h	6 ^h	12 ^h	18 ^h
Date						Date					
July	1	+ 30.0	+ 30.5	+ 31.0	+ 31.0	Aug.	24	+13.5	+13.0	+12.5	+13.0
	2	+ 32.0	+ 32.5	+ 33.5	+ 35.0		25	+14.0	+14.5	+14.0	+14.0
	3	+ 38.0	+ 40.0	+ 41.0	+ 40.0		26	+13.0	+13.0	+12.0	+12.0
	4	+ 39.0	+ 42.0	+ 42.0	+ 42.0		27	+12.0	+12.0	+12.0	+13.0
	5	+42.0	+44.0	+48.0	+49.0		28				
	6	+48.0	+51.0	+52.0	+52.0		29		+11.0	+12.0	+11.0
	7	+53.0	+54.0	+55.0	+55.0		30	+12.0	+11.0	+10.5	+10.5
	8	+57.0	+56.0	+57.0	+56.0		31	+ 9.5	+11.0	+11.0	+12.0
	9	+56.0	+57.0	+57.5	+57.5	Sept.	1	+11.0	+11.0	+11.5	+12.0
	10	+58.0	+59.0	+61.0	+59.0		2	+12.0	+14.0	+15.0	+15.5
	11	+58.0					3	+15.5	+16.0	+17.0	+17.0
	30		+35.0	+35.0	+31.0		4	+16.0	+15.0	+16.0	+16.0
	31	+32.0	+32.0	+30.5	+30.0		5	+15.5	+15.5	+15.0	+15.0
Aug.	1	+31.5	+31.0	+30.0	+28.0		6	+14.5	+12.0	+12.0	+12.0
	2	+27.0	+25.0	+23.0	+22.0		7	+12.0	+12.0	+11.5	+11.0
	3	+21.0	+23.0	+23.0	+24.0		8	+12.0	+10.5	+10.5	+11.0
	4	+24.5	+24.5	+26.5	+25.0		9	+10.5	+ 9.0	+11.5	+11.5
	5	+24.0	+24.0	+24.0	+23.0		10	+12.0	+11.5	+11.0	+10.0
	6	+23.0	+23.0	+22.0	+21.0		11	+10.0	+10.0	+ 9.0	+ 8.0
	7	+21.0	+20.0	+20.0	+18.0		12	+ 7.5	+ 8.5	+ 8.0	+ 7.5
	8	+17.0	+17.0	+16.0	+15.0		13	+ 8.0	+ 8.0	+ 9.0	+ 8.0
	9	+17.0	+20.0	+18.0	+17.0		14	+ 7.5	+ 7.0	+ 8.0	+ 8.0
	10	+15.0	+16.0	+16.0	+15.5		15	+ 7.5	+ 7.5	+ 7.5	+ 7.0
	11	+15.0	+18.0	+18.0	+18.5		16	+ 7.5	+ 8.0	+ 8.0	+ 8.0
	12	+17.0	+16.0	+16.0	+16.0		17	+ 8.0	+ 9.0	+ 6.0	+ 5.0
	13	+16.0	+17.0	+16.5	+16.5		18	+ 5.0	+ 5.0	+ 6.5	+ 6.0
14	+15.5	+15.5	+15.0	+13.0		19	+ 5.0	+ 4.0	+ 5.0	+ 5.0	
15	+12.5	+13.0	+14.0	+14.0		20	+ 7.0	+ 7.0	+ 8.0	+ 7.0	
16	+11.5	+13.0	+12.0	+11.0		21	+ 9.0	+ 7.5	+ 7.5	+ 7.0	
17	+10.0	+11.0	+12.0	+12.0		22	+ 7.0	+ 9.0	+ 9.0	+10.0	
18	+14.0	+15.0	+15.0	+15.0		23	+10.0	+10.0	+10.0	+10.0	
19	+14.5	+14.0	+14.0	+14.0		24	+11.0	+10.0	+ 9.5	+ 9.0	
20	+14.5	+14.5				25	+ 9.5	+10.0	+ 9.0	+ 8.5	
21						26	+ 8.0	+ 8.0	+ 8.0	+ 9.5	
22		+19.0	+18.0	+17.0		27	+ 9.5	+ 9.5	+10.0	+11.0	
23	+17.0	+16.5	+16.0	+15.0	Oct.	28	+12.0	+14.0	+14.0	+13.0	
						29	+12.0	+11.0	+10.0	+10.0	
						30	+ 9.5	+ 9.0	+ 9.0	+ 8.5	
						Oct. 1	+10.0	+ 8.0	+ 8.0	+ 7.0	

(to be continued.)

Table II. (Continued.)

Time		0 ^h	6 ^h	12 ^h	18 ^h	Time		0 ^h	6 ^h	12 ^h	18 ^h
Date						Date					
Oct.	2	+9.0	+7.5	+7.5	+7.0	Oct.	17				
	3	+8.0	+8.0	+8.0	+9.0		18	+8.0	+8.0	+8.0	+8.0
	4	+9.0	+9.0	+8.0	+6.0		19	+8.0	+8.0	+10.5	+11.5
	5	+2.0	+6.0	+3.5	+1.0		20	+15.0	+12.0	+12.0	+11.0
	6	0.0	-0.5	-0.5	-1.0		21	+8.0	+11.0	+10.0	+7.0
	7	-2.0	-2.5	-2.5	-2.0		22	+6.0	+7.0	+11.0	+12.0
	8	-2.0	-1.0	0.0	+2.0		23	+12.5	+17.0	+16.0	+7.0
	9	+3.0	+5.0	+5.0	+8.0		24	-10.0	-9.0	-14.0	-15.0
	10	+10.0	+10.0	+8.5	+9.0		25	-13.0	-10.0	-6.5	-6.5
	11	+8.0	+7.0	+7.0	+7.0		26	-4.5	-4.0	+1.0	+5.0
	12	+7.0	+6.0	+6.0	+8.0		27	+8.0	+11.0	+13.0	+14.5
	13	+11.0	+9.0	+7.0			28	+21.0	+24.0	+20.0	+17.0
	14						29	+5.0	+9.0		
	15						30				+18.0
	16						31	+18.0	+21.0	+22.0	+24.0

Table II. B-a.

E-W Component of Tilting at Oni-no-oidasi.

Unit=0".1

The increases in readings indicate tilt of the ground in the sense of E downward.

Time		0 ^h	6 ^h	12 ^h	18 ^h	Time		0 ^h	6 ^h	12 ^h	18 ^h
Date						Date					
Jan.	1					Jan.	16	+6.5	+6.0	+6.0	+6.0
	2						17	+5.5	+5.0	+5.0	+4.0
	3						18	+3.0	+3.0	+3.0	+3.0
	4						19	+1.5	+2.0	+1.0	-1.5
	5				+14.0		20	-1.0	+0.5	+1.0	-1.0
	6	+13.0	+9.0	+4.5	+1.0		21	-3.0	-2.0	-2.0	-1.5
	7	+1.0	+1.5	+4.5	+5.5		22	-2.0	-2.0	-2.0	-2.0
	8	+8.0	+10.0	+10.0	+9.5		23	-1.5	-2.5	-3.5	-5.0
	9	+10.0	+9.0	+9.0	+8.5		24	-7.0	-8.0	-9.0	-10.0
	10	+8.0	+7.0	+6.0	+6.0		25	-10.0	-4.5	-4.0	-4.0
	11	+9.0	+9.0	+8.0	+7.5		26	-5.0	0.0	+4.0	+4.0
	12	+7.5	+8.0	+7.0	+7.0		27	+5.0	+8.0	+7.0	+6.0
	13	+8.0	+10.5	+12.0	+12.5		28	+4.5	+3.0	+3.0	+3.0
	14	+10.0	+7.0	+4.0	+4.0		29	+4.0	+6.5	+10.5	+13.5
	15	+6.0	+7.0	+6.0	+6.5		30	+15.0	+16.0	+17.0	+18.0

(to be continued.)

Table II. (Continued.)

Time Date	0 ^h	6 ^h	12 ^h	18 ^h	Time Date	0 ^h	6 ^h	12 ^h	18 ^h
31	+17.5	+16.5	+13.5	+12.0					
Feb. 1	+ 9.0	+ 9.0	+10.0	+10.0					
2									
3					May 29				-36.0
4	+ 5.0	+ 6.0	+ 7.0	+ 7.0	30	-35.0	-34.0	-33.0	-31.5
5	+ 7.0	+ 5.5	+ 5.5	+ 3.0	31	-30.0	-30.0	-29.5	-26.5
6	+ 1.0	+ 2.0	+ 3.0	+ 3.5	June 1	-24.5	-22.0	-21.0	-21.0
7	+ 4.5	+ 8.0	+12.0	+15.5	2	-26.0	-27.0		
8	+18.5	+19.0	+20.0	+21.0					
9	+22.0	+24.5	+26.0	+28.0					
10	+28.0	+28.0	+28.0	+28.0					
11	+28.0				July 13	-19.5	-16.5	-14.0	-14.0
12					14	-14.0	-13.0	-13.5	-15.0
13					15	-15.0	-13.0	-13.0	-13.0
14					16	-13.0	-13.0	-13.0	-13.0
15					17	-15.0	-15.0	-15.0	-15.5
16					18	-15.5	-15.0	-15.0	-15.0
17					19	-15.5	-15.0	-15.0	-16.0
18					20	-16.0	-16.5	-16.5	-16.5
19	+14.0	+15.0	+16.0	+16.0	21	-16.5	-16.5	-17.0	-17.0
20	+16.5	+16.5	+16.0	+16.5	22	-17.0	-17.0	-17.5	-17.0
21	+15.5	+16.0	+15.5	+14.0	23	-17.0	-17.5	-19.0	-19.0
22	+13.0	+11.5	+10.0	+ 8.5	24	-19.0	-18.0	-18.0	-18.0
23	+ 7.5	+ 6.0	+ 6.0	+ 6.0	25	-18.0	-19.0	-19.0	-19.5
24	+ 6.0	+ 6.0	+ 6.0	+ 6.0	26	-19.5	-20.0		
25	+ 6.0	+ 6.5	+ 7.0	+ 7.5	27				
Mar. 2			+ 5.0	+ 7.0	Aug. 2	-17.0	-17.5	-18.0	-17.0
3	+ 7.0	+ 8.0	+ 8.0	+ 7.0	3	-16.0	-16.0	-16.0	-16.0
4	+ 6.0	+ 6.5	+ 8.0	+10.0	4	-16.0	-16.0	-16.0	-15.5
5	+11.0	+12.0	+12.0	+11.0	5	-15.0	-15.0	-15.0	-15.0
6	+11.0	+11.0	+10.5	+11.0	6	-14.5	-14.0	-14.0	-14.0
7	+10.0	+ 9.0	+ 8.0	+ 8.5	7	-14.5	-14.0	-14.5	-15.0
8	+ 9.0	+ 8.5	+ 7.0	+ 5.0	8	-14.0	-14.5	-14.0	-14.0
9	+ 5.0	+ 5.0	+ 5.0	+ 5.0	9	-14.0	-14.0	-14.0	-14.5
10	+ 5.0	+ 5.0	+ 5.0	+ 5.5	10	-14.0	-14.0	-14.0	-14.0
11	+ 6.0	+ 6.5	+ 7.0	+ 8.0	11	-14.0	-13.0	-14.0	-15.0

(to be continued.)

Table II. (Continued.)

Time Date	0 ^h	6 ^h	12 ^h	18 ^h	Time Date	0 ^h	6 ^h	12 ^h	18 ^h
Aug. 12	-15.0	-15.0	-16.0	-16.0	Sept. 16	+ 1.5	+ 2.0	+ 2.0	+ 3.0
13	-16.0	-15.0	-15.5	-16.0	17	+ 3.0	+ 4.5	+ 6.0	+ 7.0
14	-16.0	-15.0	-15.0	-15.0	18	+ 7.0	+ 7.0	+ 8.0	+ 8.0
15	-14.5	-13.0	-13.0	-12.5	19				+ 7.0
16	-12.0	-11.0	-12.0	-12.5	20	+ 7.0	+ 7.0	+ 8.0	+ 8.0
17	-12.0	-11.0	-11.5	-11.5	21	+ 8.0	+ 8.5	+ 8.0	+ 8.0
18	-11.0	-10.0	- 9.0	- 9.0	22	+ 7.5	+ 6.0	+ 6.0	+ 5.5
19	- 9.0	- 9.5	- 9.0	- 9.0	23	+ 5.0	+ 5.0	+ 5.0	+ 6.0
20	- 8.0	- 8.5	- 9.0	- 9.0	24	+ 6.0	+ 6.0	+ 6.0	+ 6.0
21	- 9.0	- 9.5	- 9.5	- 9.5	25	+ 5.5	+ 6.0	+ 6.0	+ 6.0
22	-10.0	-10.0	-10.0	-10.0	26	+ 6.0	+ 6.5	+ 6.0	+ 6.5
23	-11.0	-12.0	-13.0	-14.0	27	+ 7.0	+ 8.0	+ 7.0	+ 7.0
24	-14.0	-13.5	-14.0	-13.0	28	+ 6.0	+ 6.0	+ 7.0	+11.0
25	-13.0	-13.0	-13.0	-12.5					
26	-12.0	-12.0	-11.0	- 9.0					
27	- 8.5	- 9.0	- 9.0	- 9.0					
28	- 9.0	- 9.5	- 8.0	- 9.0	Oct. 3			+12.5	+13.5
29	- 8.0	- 7.0	- 6.5	- 6.5	4	+13.0	+12.0	+12.0	
30	- 6.0	- 5.0	- 5.0	- 5.5	5				
31	- 5.5	- 5.0	- 5.0	- 4.0	6				
Sept. 1	- 3.0	- 3.0	- 3.0	- 3.0					
2	- 2.0	- 2.0	- 2.5	- 3.0	18				
3	- 3.0	- 3.5	- 3.5	- 4.5	19			+ 7.0	+ 7.0
4	- 5.0	- 5.0	- 5.0	- 5.0	20	+ 7.0	+ 7.0	+ 8.0	+ 8.0
5	- 5.0	- 4.0	- 4.0	- 4.0	21	+ 8.0	+ 8.0	+ 9.0	+ 9.0
6	- 3.0	- 3.0	- 4.0	- 4.5	22	+ 9.0	+ 9.0	+ 9.0	+10.0
7	- 4.0	- 3.5	- 3.5	- 3.0	23	+ 8.0	+ 8.0	+ 8.0	+ 8.0
8	- 3.0	- 2.5	- 2.0	- 1.0	24	+ 7.0	+ 7.0	+ 7.0	
9	- 1.0	- 1.0			25			+ 8.0	+ 8.0
10					26	+ 8.0	+ 8.5	+ 8.5	+ 8.0
11					27	+ 8.0	+ 7.5	+ 7.0	+ 7.5
12			+ 1.0	0.0	28	+ 8.0	+ 8.5	+ 8.0	+ 8.0
13	+ 1.0	+ 1.0	+ 1.0	+ 1.0	29	+ 8.0	+ 7.0	+ 7.0	+ 7.0
14	+ 1.5	+ 2.0	+ 2.5	+ 1.5	30	+ 8.0			
15	0.0	+ 0.5	+ 1.0	+ 0.5	31				

(to be continued.)

Table II. B-b.
N-S Component of Tilting at Oni-no-oidasi.

Unit = 0''.1

The increases in readings indicate tilt of the ground in the sense of S downward.

Time Date	0 ^h	6 ^h	12 ^h	18 ^h	Time Date	0 ^h	6 ^h	12 ^h	18 ^h
					Feb. 21	+43.0	+54.0	+56.0	+58.0
					22	+60.0	+60.0	+60.0	+61.0
					23	+60.0	+59.0	+60.5	+61.0
Jan. 18				+ 9.0	24	+61.0	+60.0	+59.0	+59.5
19	+10.0	+12.0	+11.0	+ 8.0	25	+59.0	+58.0	+58.5	+58.5
20	+ 8.0	+ 9.0	+11.0	+10.5	26	+58.5	+58.0	+57.0	+57.0
21	+13.0	+15.0	+16.0	+15.0	27	+57.0	+59.0	+58.5	+58.5
22	+15.5	+16.0	+16.0	+15.5	28	+59.0	+59.5	+59.0	+58.0
23	+19.0	+24.0	+26.5	+26.0	29	+58.0	+58.5	+58.5	+59.0
24	+27.0	+30.0	+31.5	+3.00	Mar. 1	+60.0	+60.5	+62.0	+62.5
25	+30.5	+31.5	+31.0	+27.0	2	+63.0	+63.5	+63.5	+60.0
26	+28.5	+27.5	+26.0	+26.5	3	+58.5	+58.5	+58.5	+57.0
27	+27.0	+29.0	+31.0	+31.5	4	+56.0	+55.5	+56.5	+57.0
28	+34.0	+35.0	+33.0	+32.0	5	+55.0	+53.0	+51.0	+50.0
29	+32.0	+32.0	+30.0	+28.0	6	+51.0	+51.5	+52.0	+52.0
30	+28.0	+30.0	+31.0	+33.0	7	+53.0	+57.5	+58.5	+58.5
31	+38.0	+39.5	+36.0	+36.0	8	+58.0	+58.0	+57.5	+58.5
Feb. 1	+37.5	+40.0	+43.0	+45.0	9	+59.0	+58.5	+57.0	+56.5
2	+48.0	+51.5	+53.0	+53.0	10	+57.0	+57.0	+57.0	+56.5
3	+53.0	+54.0	+54.0	+53.0	11	+55.0	+54.0	+52.5	+53.0
4	+53.0	+53.5	+53.5	+53.5	12	+54.0	+55.0	+55.0	+53.5
5	+52.5	+50.5	+50.0	+49.0	13	+53.5	+53.5	+54.0	+52.5
6	+50.0	+50.5	+49.0	+49.0	14	+51.0	+47.0	+43.0	
7	+51.0	+52.5	+53.0	+52.5					
8	+54.0	+55.0	+55.0	+54.0					
9	+54.0	+55.0	+54.5	+53.5					
10	+53.5	+55.0	+56.0	+56.5					
11	+55.0	+54.0	+55.0	+57.0	July 13	+ 6.0	+ 6.0	+ 6.5	+ 7.0
12	+57.0	+56.0	+55.0	+55.0	14	+ 7.0	+ 7.0	+ 6.5	+ 6.0
13	+56.0	+57.0	+56.5	+58.5	15	+ 6.0	+ 6.0	+ 6.0	+ 6.0
14	+59.5	+60.0	+58.0	+60.0	16	+ 5.5	+ 4.5	+ 4.0	+ 3.0
15	+60.0	+59.5	+58.5	+58.5	17	+ 2.0	+ 1.0	+ 1.0	+ 1.0
16	+59.5	+58.5	+60.0	+62.0	18	- 1.5	- 3.0	- 4.0	- 4.0
17	+62.0	+63.0	+62.0	+63.0	19	- 3.5	- 4.5	- 6.5	- 8.0
18	+63.0	+60.0	+57.0	+53.0	25	- 9.0	-11.0	-12.0	-12.0
19	+51.0	+50.0	+50.0	+50.0	21	-11.0	-11.0	-12.0	-13.0
20	+51.0	+53.0	+54.0	+54.0	22	-13.0	-14.0	-13.0	-13.0

(to be continued.)

Table II. (Continued.)

Time Date	0 ^h	6 ^h	12 ^h	18 ^h	Time Date	0 ^h	6 ^h	12 ^h	18 ^h
July 23	-13.0	-13.0	-13.0	-13.0	Sept. 12				
24	-13.0	-13.0	-13.0	-12.0	13				
25	-13.5	-14.0	-13.0	-13.0	14				
26	-14.0	-14.0			15				
					16				
					17				
					18			- 3.5	- 3.0
Aug. 10	-12.5	-12.0	-13.0	-15.0	19	- 3.0	- 5.5	- 7.0	- 8.5
11	-16.0	-16.0	-16.0	-17.0	20	- 8.5	-11.0	-11.5	-12.0
12	-20.0	-20.5	-20.0	-23.0	21	-10.0	- 9.0	-10.0	-11.5
13	-25.0	-26.0	-25.5	-25.5	22	-13.5	-17.0	-22.5	-25.0
14	-27.0	-25.5	-24.5	-23.0	23	-27.0	-29.0	-27.0	-24.0
15	-21.5	-22.5	-23.5	-23.5	24	-23.0	-23.5	-24.5	-27.0
16	-22.5	-23.0	-26.0	-26.0	25	-28.0	-27.0	-28.0	-29.0
17	-26.0	-27.0	-28.0	-26.0	26	-29.0	-28.5	-29.0	-29.0
18	-26.0	-26.0	-26.5	-23.5	27	-28.0	-26.0	-24.0	-24.0
19	-22.0	-20.0	-20.0	-22.5	28	-25.0	-27.0	-28.0	-28.0
20	-21.0	-21.0	-24.0	-25.0					
21	-25.0	-24.5	-25.0	-27.0					
22	-30.0	-31.0	-31.5	-31.0					
23	-33.0	-34.0	-36.0	-39.0	Oct. 6	+10.0	+10.5	+11.0	+10.5
24					7	+ 7.5	+ 7.5	+ 7.0	+ 6.5
25					8	+ 4.5	+ 3.5	+ 2.5	+ 2.0
26					9	+ 2.5	+ 3.5	+ 4.5	+ 4.0
27					10	+ 3.5	+ 3.0	+ 2.0	0.0
28		-11.0	-11.0	-11.0	11	- 1.0	- 2.0	- 2.0	- 1.5
29	-12.5	-14.5	-16.0	-13.0	12	- 3.0	- 3.0	- 1.0	- 1.0
30	-12.0	-15.0	-18.0	-18.5	13	- 2.0	- 2.0	- 2.0	- 2.5
31	-20.5				14	- 2.5	- 3.0	- 2.5	- 0.5
					15	+ 0.5	+ 1.5	+ 2.0	+ 2.0
					16	+ 2.0	+ 2.0	+ 2.0	+ 1.0
					17	0.0	+ 2.0	+ 4.0	+ 3.5
Sept. 5			+31.0	+30.0	18	+ 1.5	- 1.0	- 0.5	0.0
6	+26.0	+25.0	+25.5	+26.5	19	- 1.0	- 1.5	0.0	+ 2.0
7	+24.0	+24.0	+24.5	+24.0	20	+ 3.0	+ 5.0	+ 7.0	+ 8.5
8	+20.0	+17.0	+17.5	+17.5	21	+10.0	+12.0	+14.0	+14.0
9	+16.0	+12.0	+13.5	+13.0	22	+12.0	+ 8.0	+ 9.0	+ 9.0
10	+11.0	+ 6.5	+ 5.0		23	+ 8.0	+ 7.0	+ 7.0	
11					24				

(to be continued.)

Table II. C-a.
E-W Component of tilting at Komoro.

Unit=0".05

The increases in readings indicate tilt of the ground in the sense of W downward.

Time		0 ^h	6 ^h	16 ^h	18 ^h	Time		12 ^h	18 ^h		
Date	Date										
Jan.	1	+ 33.0	+ 34.0	+ 35.0	+ 33.5	Mar.	4	+129.5	+130.0	+131.0	+136.0
	2	+ 33.0	+ 30.0	+ 27.5	+ 26.5		5	+139.0	+135.0	+137.0	+137.0
	3	+ 22.5	+ 19.0	+ 16.5	+ 13.0		6	+139.0	+137.0	+140.0	+149.0
	4	+ 10.0	+ 10.5	+ 12.0	+ 13.0		7	+144.5	+143.5	+148.0	+147.0
	5	+ 14.5	+ 16.0	+ 20.0	+ 27.5		8	+143.0	+138.0	+138.0	+135.0
	6	+ 32.5	+ 37.5	+ 43.0	+ 53.5		9	+130.5	+127.5	+130.5	+127.0
	7	+ 69.0	+ 63.5	+ 63.0	+ 67.0		10	+124.0	+124.0	+126.0	+127.0
	8	+ 71.5	+ 74.0	+ 73.0	+ 75.0		11	+125.0	+123.0	+124.0	+124.0
	9	+ 76.0	+ 76.5	+ 80.0			12	+123.0	+121.5	+120.0	+115.0
Feb.	8				+ 34.0	13	+108.5	+104.5	+100.0	+ 96.0	
	9	+ 28.0	+ 26.0	+ 22.0	+ 17.5	14	+ 96.0	+ 92.0	+ 88.0	+ 84.0	
	10	+ 13.0	+ 10.0	+ 9.5	+ 9.5	15	+ 80.0	+ 77.0	+ 72.0	+ 67.5	
	11	+ 9.0	+ 6.0	+ 7.0	+ 10.0	16	+ 67.5	+ 70.0	+ 75.0	+ 78.0	
	12	+ 11.0	+ 11.0	+ 10.0	+ 11.0	17	+ 78.0	+ 77.0	+ 76.0	+ 70.0	
	13	+ 11.0	+ 11.0	+ 13.0	+ 15.0	18	+ 67.0	+ 66.0	+ 64.0	+ 63.0	
	14	+ 14.5	+ 13.0	+ 14.5	+ 15.0	19	+ 68.0	+ 77.0	+ 83.0	+ 85.0	
	15	+ 15.0	+ 16.0	+ 17.0	+ 18.0	20	+ 88.5	+ 87.5	+ 89.0	+ 89.0	
	16	+ 19.0	+ 18.0	+ 18.0	+ 16.0	21	+ 87.5	+ 85.0	+ 80.0	+ 76.5	
	17	+ 16.0	+ 15.0	+ 13.0	+ 10.0	22	+ 75.0	+ 75.0	+ 76.5	+ 75.0	
	18	+ 5.0	+ 5.0	+ 1.0	+ 1.0	23	+ 68.5	+ 66.5	+ 66.5	+ 66.5	
	19	+ 1.0	+ 4.0	+ 4.0	+ 4.0	24	+ 66.5	+ 65.0	+ 65.0	+ 62.0	
	20	+ 5.0	+ 7.0	+ 7.0	+ 8.0	25	+ 61.0	+ 61.5	+ 65.0	+ 69.0	
	21	+ 15.0	+ 17.0	+ 23.5	+ 31.0	26	+ 78.5	+ 81.0	+ 98.0	+104.5	
	22	+ 36.0	+ 35.0	+ 37.5	+ 35.0	27	+110.5	+115.0	+108.0	+105.0	
	23	+ 33.0	+ 31.0	+ 29.0	+ 28.0	28	+ 99.0	+ 90.0	+ 80.0	+ 72.0	
24	+ 29.0	+ 30.0	+ 30.0	+ 28.0	29	+ 69.0	+ 66.0	+ 63.0	+ 60.0		
25	+ 25.0	+ 24.0	+ 23.0	+ 26.5	30	+ 60.0	+ 61.5	+ 66.5	+ 74.0		
26	+ 29.5	+ 28.0	+ 25.0	+ 24.5	31	+ 82.0	+ 87.0	+ 90.0	+ 92.0		
27	+ 23.0	+ 22.0	+ 21.0	+ 22.0	Apr.	1	+ 92.0	+ 89.0	+ 87.0	+ 87.0	
28	+ 24.0	+ 24.0	+ 30.0	+ 48.0		2	+ 86.0	+ 85.0	+ 82.0	+ 76.0	
29	+ 64.0	+ 76.0	+ 85.0	+ 97.0		3	+ 68.5	+ 60.0	+ 52.5	+ 50.0	
Mar.	1	+104.0	+107.0	+111.0		+124.0	4	+ 52.0	+ 53.0	+ 55.0	+ 55.5
	2	+127.0	+125.0	+126.5		+131.0	5	+ 57.0	+ 59.0	+ 59.5	+ 59.0
	3	+130.0	+128.0	+127.0		+128.5	6	+ 58.5	+ 57.0	+ 56.5	+ 56.5
						7	+ 56.5	+ 53.5	+ 49.5	+ 48.5	
						8	+ 48.5	+ 47.0	+ 46.5	+ 46.0	

(to be continued.)

Table II. (Continued.)

Time Date	0 ^h	6 ^h	12 ^h	18 ^h	Time Date	0 ^h	6 ^h	12 ^h	18 ^h
Apr. 9	+46.0	+43.0	+41.0	+42.0	May 18	+47.0	+46.5	+45.0	+42.0
10	+44.0	+45.5	+45.0	+48.0	19	+42.0	+40.0	+39.5	+41.5
11	+49.0	+55.0	+60.0	+60.0	20	+41.0	+40.5	+40.0	+39.0
12	+60.0	+60.0	+59.0	+60.0	21	+40.0	+40.0	+38.5	+38.0
13	+61.0	+61.0	+63.0	+69.0	22	+37.5	+37.5	+36.0	+35.0
14	+73.0	+76.5	+78.0	+79.0	23	+34.0	+36.0	+35.0	+35.0
15	+79.0	+80.0	+79.0	+77.0	24	+35.0	+33.0	+31.0	+31.0
16	+74.0	+67.5	+64.0	+60.5	25	+30.0	+28.0	+25.0	+24.0
17	+61.0	+60.0	+59.0	+56.5	26	+23.5	+20.0	+17.5	+18.0
18	+56.0	+54.0	+52.0	+46.0	27	+18.5	+19.0	+21.5	+21.0
19	+42.0	+42.0	+44.0	+46.0	28	+17.0	+13.0	+8.0	+6.0
20	+48.0	+47.0	+45.0	+43.0	29	+3.0	0	-2.0	-2.0
21	+42.0	+40.0	+37.0	+37.0	30	+1.5	-3.0	-3.5	-2.0
22	+37.0	+38.5	+40.0	+41.0	31	0	-5.0	-10.0	-13.0
23	+42.0	+44.0	+46.0	+44.0	June 1	-13.0	-15.5	-18.0	-20.0
24	+45.0	+45.0	+44.0	+41.0	2	-20.0	-20.0	-22.5	-20.0
25	+39.0	+38.5	+35.5	+34.0	3	-20.0	-22.0	-19.0	-15.0
26	+31.0	+33.0	+32.0	+32.5	4	-15.0	-15.0	-11.0	-7.0
27	+33.0	+33.0	+32.5	+33.0	5	-5.0	-4.0	-4.0	-3.0
28	+35.0	+36.0	+36.5	+37.0	6	-1.5	-1.0	0	+2.0
29	+39.5	+41.0	+44.0	+45.0	7	+2.5	+2.0	+3.5	+5.5
30	+46.0	+48.0			8	+6.0	+4.0	+4.5	+6.0
					9	+6.0	+6.5	+6.5	+6.5
					10	+6.5	+6.0	+3.0	+4.5
May 3			+50.0	+47.5	11	+4.5	+4.0	+2.0	+0.5
4	+49.0	+50.0	+48.5	+48.0	12	+0.5	0	-0.5	0
5	+49.0	+49.0	+47.0	+47.5	13	0	0	0	+1.5
6	+47.5	+47.0	+45.5	+49.0	14	+2.5	+3.5	+3.0	+4.5
7	+49.0	+47.0	+46.0	+44.0	15	+6.0	+6.0	+6.5	+7.0
8	+44.0	+44.0	+42.0	+42.0	16	+7.5	+7.0	+6.5	+6.5
9	+42.0	+43.0	+41.0	+40.0	17	+7.5	+8.0	+8.0	+9.0
10	+40.0	+39.0	+37.0	+37.5	18	+10.0	+11.0	+11.0	+11.0
11	+37.5	+37.5	+35.0	+34.0	19	+11.0	+10.5	+11.5	+13.0
12	+36.0	+37.0	+36.0	+36.0	20	+12.0	+12.0	+11.0	+12.0
13	+37.0	+37.5	+37.0	+38.0	21	+12.0	+10.0	+9.0	+8.0
14	+39.0	+39.0	+37.0	+38.0	22	+7.0	+6.5	+5.0	+5.0
15	+39.0	+39.5	+37.5	+38.0	23	+5.0	+4.5	+2.0	+3.0
16	+40.0	+40.0	+39.0	+41.0	24	+2.5	+2.0	+0.5	+2.0
17	+46.5	+46.5	+45.0	+45.0	25	+2.5	+1.5	0	-1.0

(to be continued.)

Table II. (Continued.)

Time		0 ^h	6 ^h	12 ^h	18 ^h	Time		0 ^h	6 ^h	12 ^h	18 ^h
Date	Date										
June	26	- 1.0	- 2.0	- 3.5	- 2.5	Aug.	22	+25.0	+25.0	+26.5	+28.0
	27	- 1.0	+ 1.5	+ 2.0	+ 6.0		23	+30.0	+30.0	+31.0	+34.5
	28	+ 6.0	+ 6.0	+ 5.5	+ 5.5		24	+35.0	+37.0	+40.0	+42.5
July	20	-11.0	-13.5	-14.0	-13.0	25	+44.0	+43.0	+40.0	+39.0	
	21	- 9.0	- 7.5	- 4.0	- 5.0	26	+37.5	+36.0	+36.0	+36.0	
	22	- 4.0	- 8.5	-13.5	-16.5	27	+35.0	+33.0	+35.0	+37.0	
	23	-13.5	-16.0	-18.0	-17.5	28	+36.5	+36.5	+39.0	+41.0	
	24	-17.0	-15.0	-12.0	- 9.0	29	+41.0	+42.0	+42.0	+41.5	
	25	- 5.0	- 4.5	- 5.0	- 4.0	30	+40.0	+40.0	+40.0	+40.0	
	26	- 2.0	- 1.0	- 1.0	+ 2.0	31	+41.0	+40.5	+41.0	+41.5	
	27	+ 6.5	+ 9.0	+14.0	+16.0	Sept.	1	+41.5	+40.5	+40.0	+40.0
	28	+18.0	+18.0	+17.0	+17.5		2	+32.0	+38.0	+37.0	+33.0
	29	+20.0	+20.0	+20.0	+22.0		3	+30.0	+27.0	+23.0	+23.0
	30	+23.0	+24.0	+22.5	+24.0		4	+23.5	+23.5	+23.5	+24.0
31	+29.0	+31.5	+32.5	+34.0	5		+24.5	+25.0	+23.5	+25.0	
Aug.	1	+36.0	+35.5	+35.0	+36.0		6	+27.5	+29.0	+28.5	+28.5
	2	+37.0	+36.0	+37.5	+40.0		7	+32.0	+33.5	+34.5	+34.0
	3	+41.0	+40.5	+40.5	+42.0		8	+37.5	+37.5	+36.0	+36.5
	4	+44.0	+46.0	+46.5	+45.5		9	+39.0	+38.5	+37.5	+43.0
	5	+44.5	+43.0	+43.0	+43.0		10	+44.5	+43.0	+43.0	+45.0
	6	+42.5	+42.5	+42.0	+41.5		11	+45.0	+48.5	+52.0	+55.0
	7	+41.5	+41.0	+40.0	+40.0	12	+53.0	+52.0	+53.5	+55.5	
	8	+40.0	+39.5	+39.5	+40.0	13	+56.0	+56.5	+56.5	+58.0	
	9	+39.0	+38.0	+37.5	+38.0	14	+59.0	+58.5	+58.0	+59.0	
	10	+37.0	+37.0	+39.0	+40.0	15	+57.0	+54.5	+54.0	+55.0	
	11	+40.0	+40.0	+39.5	+39.5	16	+54.0	+53.5	+54.0	+58.0	
12	+38.0	+36.0	+36.5	+35.5	17	+57.0	+50.0	+51.0	+50.0		
13	+35.5	+35.0	+35.0	+35.5	18	+49.0	+43.5	+44.0	+45.5		
14	+36.0	+35.5	+36.0	+36.0	19	+45.5	+45.0	+46.0	+48.0		
15	+35.0	+35.0	+35.0	+35.0	20	+46.0	+44.0				
16	+35.5	+35.0	+36.0	+38.0	21						
17	+40.0	+41.0	+39.5	+39.0	22						
18	+40.0	+38.5	+38.0	+38.0	23						
19	+33.0	+28.0	+27.0	+29.0	24				+17.0		
20	+29.0	+27.5	+26.5	+27.0	25	+11.0	+ 5.0	+ 7.0	+ 9.5		
21	+26.5	+26.0	+23.5	+24.0	26	+11.5	+12.5				
					27			+20.0	+14.0		
					28	+10.0	+ 9.0	+ 9.0	+ 8.0		
					29			+ 7.0	+ 6.5		

(to be continued.)

Table II. (Continued.)

Time Date	0 ^h	6 ^h	12 ^h	18 ^h	Time Date	0 ^h	6 ^h	12 ^h	18 ^h
Sept. 30	+ 6.5	+ 6.0	+ 5.5	+ 5.0	Dec. 14	-21.0	-21.0	-19.0	-18.0
Oct. 1	+ 4.0	0	- 1.0	0	15	-18.0	-17.5	-13.0	
2	+ 1.0	+ 4.0	+ 7.0	+11.0	16				
					17				- 7.0
					18	-15.0	-16.0	-17.0	-15.0
					19	-17.0	-21.0	-23.5	-24.0
Dec. 2				+ 4.0	20	-24.5	-24.5	-24.0	-23.0
3	+ 3.0	+ 1.0	+ 0.5	+ 3.5	21	-20.0	- 6.0	- 2.0	- 4.5
4	+ 1.0	+ 0.5	+ 1.0	+ 3.0	22	- 5.0	0	- 2.5	- 1.0
5	- 3.0	- 5.5	- 5.5	- 3.5	23	- 3.0	- 6.5	- 6.5	- 6.5
6	0	+ 4.5	+ 0.5	+ 7.0	24	- 8.0	- 8.5	- 8.5	- 6.5
7	+11.0	+11.0	+ 9.0	+11.5	25	- 5.0	- 7.0	- 7.0	- 5.5
8	+10.0	+ 7.5	+ 5.0	+ 6.0	26				
9	+ 6.0	+ 2.0	+ 1.5	+ 5.0	27			-10.0	-15.0
10	+ 7.0	+ 9.0	+ 9.5	+11.0	28	-21.0	-20.0	-21.0	-22.5
11	+12.0	+12.0	+10.0	- 2.0	29	-27.5	-28.0	-28.0	-28.5
12	-13.0	-15.0	-15.5	-15.5	30	-30.0	-31.0	-29.0	-29.0
13	-19.0	-20.0	-21.5	-21.0	31	-29.0	-22.5	-16.5	-15.5

Table II. C-b.

N-S Component of tilting at Komoro.

Unit=0''·05

The increases in readings indicate tilt of the ground in the sense of N downward.

Time Date	0 ^h	6 ^h	12 ^h	18 ^h	Time Date	0 ^h	6 ^h	12 ^h	18 ^h
Jan. 1	-24.0	-27.0	-28.0	-29.0	Jan. 13	-25.5	-24.5	-26.5	-26.0
2	-28.5	-29.0	-30.0	-29.0	14	-24.5	-23.5		
3	-27.5	-28.5	-28.5	-27.0					
4	-25.0	-25.5	-28.0	-27.5					
5	-27.0	-28.0	-31.5	-32.0	25			-23.0	-21.5
6	-33.0	-34.0	-33.0	-30.5	26	-20.0	-19.0	-18.0	-16.0
7	-30.5	-33.5	-38.5	-37.5	27	-13.5	-10.0	- 8.5	-10.0
8	-38.0	-41.0	-41.0	-38.0	28	-13.0	-12.5	-13.0	-12.5
9	-36.0	-35.5	-37.0	-35.0	29	-13.0	-12.5	-11.0	- 9.0
10	-34.0	-33.0	-33.5	-33.0	30	- 7.5	- 6.0	- 3.5	- 5.0
11	-32.5	-32.5	-35.0	-32.0	31	- 7.5	- 8.0	- 9.0	-11.0
12	-30.0	-30.0	-30.5	-29.0	Feb. 1	-11.0	-12.0	-15.0	-16.0

(to be continued.)

Table II. (Continued.)

Time		0 ^h	6 ^h	12 ^h	18 ^h	Time		0 ^h	6 ^h	12 ^h	18 ^h
Date	Date										
Feb.	2	-16.5	-18.0	-18.0	-18.0	Mar.	12	+18.5	+21.5	+20.0	+18.5
	3	-17.5	-17.5	-17.5	-16.5		13	+15.5	+13.5	+10.0	+11.0
	4	-16.5	-18.0	-17.0	-15.0		14	+11.5	+14.0	+17.0	+20.0
	5	-15.0	-15.0	-17.0	-16.5		15	+22.0	+23.5	+24.0	+23.5
	6	-13.0	-11.0	-9.0	-7.5		16	+24.5	+23.0	+20.5	+19.5
	7	-6.5	-6.5	-6.5	-4.0		17	+20.5	+23.0	+23.0	+24.5
	8	-4.0	-4.5	-5.0	-4.0		18	+27.0	+30.0	+30.0	+34.5
	9	-4.0	-4.0	-4.0	-4.0		19	+35.0	+31.5	+25.0	+21.5
	10	-2.0	-1.5	0	0		20	+21.0	+20.5	+19.5	+21.0
	11	0	0	-1.0	-2.0		21	+21.5	+24.0	+27.0	+30.0
	12	-3.0	-2.5	-3.0	-5.0		22	+32.0	+34.0	+33.0	+32.0
	13	-5.0	-5.0	-6.5	-7.0		23	+23.5	+32.5	+33.0	+34.5
	14	-6.5	-6.0	-6.0	-5.0		24	+37.0	+37.0	+37.0	+44.0
	15	-5.0	-2.0	-3.5	-3.0		25	+42.0	+43.0	+41.5	+39.0
	16	-1.0	+1.0	+2.0	+3.0		26	+33.5	+33.0	+29.0	+24.5
	17	+3.5	+4.5	+6.0	+6.0		27	+23.5	+19.5	+19.5	+21.0
	18	+8.5	+11.5	+10.5	+9.0		28	+23.5	+26.0	+26.5	+26.5
	19	+13.0	+17.0	+20.0	+21.5		29	+26.5	+26.5	+26.0	+27.5
	20	+23.0	+25.0	+27.0	+27.0		30	+29.5	+32.0	+27.0	+22.0
	21	+25.5	+22.0	+20.0	+20.0		31	+17.0	+13.5	+12.0	+11.0
	22	+18.5	+15.0	+13.0	+13.0	Apr.	1	+10.0	+11.0	+12.0	+12.5
	23	+16.0	+17.0	+18.5	+20.5		2	+16.0	+17.5	+17.5	+19.0
	24	+21.0	+20.5	+21.0	+22.0		3	+20.0	+19.0	+18.0	+18.0
	25	+24.0	+26.0	+25.5	+25.0		4	+20.0	+22.5	+25.0	+25.5
	26	+25.0	+27.0	+27.0	+27.5		5	+23.5	+20.5	+16.5	+14.5
	27	+27.5	+27.5	+27.0	+27.5		6	+17.0	+20.0	+23.0	+24.0
	28	+28.5	+29.5	+30.0	+30.5		7	+25.0	+26.0	+25.5	+26.5
	29	+30.5	+30.0	+27.0	+26.0		8	+28.0	+29.0	+29.0	+30.0
Mar.	1	+26.5	+23.0	+20.0	+20.0		9	+31.0	+31.5	+34.0	+37.0
	2	+20.0	+19.0	+18.5	+18.5		10	+40.0	+43.0	+45.5	+42.5
	3	+20.5	+21.5	+20.0	+22.5		11	+39.5	+36.0	+33.5	+32.0
	4	+25.5	+25.0	+23.0	+22.0		12	+32.5	+32.5	+32.5	+33.0
	5	+23.0	+22.0	+21.0	+22.0		13	+35.0	+36.0	+36.5	+38.0
	6	+24.0	+23.5	+22.0	+18.5		14	+35.5	+30.0	+28.0	+27.5
	7	+17.5	+19.0	+18.5	+17.5		15	+27.0	+25.0	+21.0	+20.5
	8	+19.0	+20.0	+21.0	+21.5		16	+21.0	+22.0	+23.0	+25.5
	9	+22.5	+22.5	+22.0	+23.5		17	+28.5	+30.0	+31.0	+31.5
	10	+25.5	+25.0	+23.0	+20.5		18	+32.0	+31.5	+27.5	+25.0
	11	+23.5	+23.5	+22.0	+18.5		19	+23.0	+22.0	+23.0	+23.0

(to be continued.)

Table II. (Continued.)

Time Date	0 ^h	6 ^h	12 ^h	18 ^h	Time Date	0 ^h	6 ^h	12 ^h	18 ^h
Apr. 20	+26.0	+26.0	+26.0	+27.0	May 29	-13.0	-13.0	-12.0	- 7.0
21	+29.5	+31.0	+30.0	+34.5	30	- 3.5	0	+ 3.5	+ 7.0
22	+33.0	+31.0	+27.5	+23.5	31	+10.0	+ 2.0	-11.0	-22.0
23	+20.5	+19.5	+20.0	+20.5	June 1	-27.0	-29.0	-30.0	-28.5
24	+24.5	+30.0	+26.0	+22.5	2	-23.5	-21.0	-19.5	-15.0
25	+20.0	+20.0	+18.5	+15.0	3	-10.0	- 7.0	- 4.5	+ 1.5
26	+ 9.5	+ 6.0	+ 5.0	+ 5.5	4	+ 3.5	+ 6.5	+11.0	+15.5
27	+ 7.0	+10.0	+ 8.5	+11.0					
28	+14.5	+14.0	+10.5	+10.5					
29	+12.0	+14.0	+18.0	+21.5					
30	+25.5	+28.0	+29.0	+31.5	10				+ 9.5
May 1	+33.5	+35.0	+35.0	+36.5	11	+ 9.0	+ 9.0	+ 8.5	+10.5
2	+40.5	+42.5	+37.0	+34.0	12	+12.5	+12.0	+10.0	+11.0
3	+33.0	+33.0	+32.5	+34.0	13	+13.0	+11.0	+ 8.5	+ 9.0
4	+35.5	+36.5	+36.5	+38.5	14	+12.5	+14.5	+14.0	+15.0
5	+39.5	+39.5	+37.5	+39.5	15	+16.5	+17.5	+18.0	+19.5
6	+41.0	+41.0	+40.5	+40.5	16	+20.5	+21.0	+21.0	+22.0
7	+39.5	+37.5	+35.0	+33.5	17	+24.5	+24.5	+24.0	+27.5
8	+35.0	+34.0	+33.5	+33.0	18	+29.0	+30.0	+29.0	+30.5
9	+35.0	+32.5	+34.0	+35.0	19	+31.5	+30.0	+30.5	+31.5
10	+36.5	+33.5	+32.5	+33.0	20	+31.0	+31.0	+32.0	+33.0
11	+33.5	+32.0	+32.0	+34.0	21	+34.0	+34.0	+33.5	+33.5
12	+36.0	+35.5	+37.0	+39.5	22	+32.5	+30.0	+28.5	+30.0
13	+41.5	+41.0	+42.0	+45.0	23	+30.0	+28.0	+24.5	+24.5
14	+46.0	+45.5	+45.0	+45.0	24	+25.0	+24.0	+20.0	+20.0
15	+45.5	+45.5	+46.0	+49.5	25	+20.5	+21.0	+18.5	+18.5
16	+51.5	+51.5	+51.5	+53.0	26	+19.0	+18.5	+16.5	+17.0
17	+54.0	+54.0	+54.0	+57.0	27	+18.5	+19.0	+17.0	+17.0
18	+56.5	+54.5	+54.5	+55.5	28	+19.0	+18.0	+16.0	+12.0
19	+55.5	+55.5	+55.5	+54.0					
20	+53.0	+51.5	+52.0	+55.0					
21	+58.0	+59.0	+60.0	+61.0					
22	+61.0	+58.5	+59.0	+59.0	July 12				-18.0
23	+58.5	+57.0	+54.0	+52.5	13	- 4.0	+ 5.5	+ 1.0	- 9.0
24	+48.5	+45.5	+42.5	+36.5	14	-15.0	-23.0	-25.5	-24.5
25	+31.0	+26.5	+25.5	+25.0	15	-16.5	-13.5	-12.0	-10.0
26	+25.0	+25.0	+25.0	+25.5	16	- 5.0	- 5.0	- 4.5	- 2.0
27	+26.0	+26.5	+26.5	+23.0	17	+ 3.5	+10.0	+ 9.5	+17.0
28	+15.0	+ 3.0	- 6.0	-10.0	18	+19.0	+17.5	+18.5	+16.5

(to be continued.)

Table II. (Continued.)

Time		0 ^h	6 ^h	12 ^h	18 ^h	Time		0 ^h	6 ^h	12 ^h	18 ^h
Date	Date										
July	19	+ 16.5	+ 17.0	+ 18.0	+ 19.5	Aug.	27	+103.5	+103.0	+100.0	+ 99.0
	20	+ 23.0	+ 27.5	+ 27.5	+ 27.5		28	+100.0	+100.5	+101.0	+103.0
	21	+ 32.0	+ 33.5	+ 36.0	+ 41.0		29	+105.0	+106.5	+106.5	+109.5
	22	+ 48.5	+ 43.0	+ 38.5	+ 40.5		30	+111.5	+112.5	+110.5	+114.0
	23	+ 41.0	+ 36.5	+ 37.5	+ 38.5		31	+115.5	+115.0	+111.5	+111.0
	24	+ 37.5	+ 36.0	+ 37.5	+ 45.0	Sept.	1	+112.0	+111.0	+107.5	+107.0
	25	+ 53.0	+ 58.5	+ 60.0	+ 64.5		2	+ 92.0	+ 65.0	+ 52.0	+ 47.0
	26	+ 73.0	+ 76.5	+ 78.5	+ 83.0		3	+ 46.0	+ 47.0	+ 48.0	+ 53.0
	27	+ 82.0	+ 81.0	+ 80.0	+ 81.0		4	+ 60.0	+ 63.5	+ 65.0	+ 70.0
	28	+ 81.5	+ 81.0	+ 79.0	+ 81.0		5	+ 74.0	+ 76.0	+ 76.0	+ 79.0
	29	+ 83.0	+ 83.0	+ 82.5	+ 85.0		6	+ 80.0	+ 81.0	+ 79.5	+ 82.0
	30	+ 91.5	+ 94.0	+ 94.0	+ 96.0		7	+ 84.5	+ 87.5	+ 88.0	+ 87.5
	31	+102.0	+103.5	+102.5	+105.0		8	+ 88.0	+ 88.5	+ 87.5	+ 87.5
Aug.	1	+108.5	+109.0	+106.5	+107.0		9	+ 90.0	+ 92.5	+ 93.5	+ 94.0
	2	+108.5	+110.5	+111.0	+113.0		10	+ 96.0	+ 98.0	+ 97.0	+ 95.0
	3	+114.5	+115.5	+116.5	+117.5		11	+ 96.0	+ 98.0	+ 98.0	+ 99.0
	4	+117.0	+115.5	+114.5	+116.0		12	+101.0	+103.0	+103.0	+101.0
	5	+116.0	+114.5	+113.5	+111.5		13	+101.5	+103.0	+103.0	+104.0
	6	+111.5	+112.0	+110.0	+107.5		14	+106.0	+103.5	+102.5	+103.0
	7	+107.5	+106.5	+103.5	+102.0		15	+101.5	+ 99.0	+ 98.0	+ 99.0
	8	+100.5	+100.5	+ 99.5	+ 98.5		16	+ 99.0	+ 98.0	+ 97.0	+ 95.0
	9	+100.5	+101.0	+ 99.0	+ 95.0		17	+ 99.5	+ 98.5	+ 99.0	+ 99.5
	10	+ 96.0	+ 97.0	+ 97.0	+ 97.0		18	+ 98.0	+ 95.5	+ 94.5	+ 95.5
	11	+ 96.0	+ 95.0	+ 93.0	+ 89.5		19	+ 95.5	+ 96.5	+ 97.5	+100.5
	12	+ 88.5	+ 89.5	+ 88.0	+ 85.5		20	+100.5	+ 99.5	+ 98.5	+100.0
	13	+ 87.5	+ 89.0	+ 88.5	+ 87.5		21	+100.0	+ 98.5	+ 98.0	+ 96.0
	14	+ 91.0	+ 92.0	+ 93.0	+ 93.5		22	+ 92.0	+ 90.0	+ 89.0	+ 89.0
	15	+ 96.5	+ 97.0	+ 97.0	+ 95.0		23	+ 91.5	+ 93.5	+ 94.5	+ 95.5
	16	+ 96.0	+ 96.5	+ 96.5	+ 94.0		24	+ 90.0	+ 80.0	+ 80.0	+ 83.0
	17	+ 92.0	+ 89.0	+ 87.0	+ 87.0		25	+ 82.5	+ 68.0	+ 59.0	+ 63.0
	18	+ 88.5	+ 89.0	+ 89.5	+ 89.5		26	+ 65.0	+ 49.0	+ 52.0	+ 58.5
	19	+ 90.0	+ 90.0	+ 89.0	+ 90.0		27	+ 59.5	+ 60.0	+ 55.0	+ 47.5
	20	+ 93.0	+ 93.0	+ 86.0	+ 81.0		28	+ 40.5	+ 35.0	+ 33.0	+ 34.0
	21	+ 78.0	+ 75.5	+ 69.0	+ 69.0		29	+ 36.5	+ 40.0	+ 45.0	+ 49.5
	22	+ 76.0	+ 78.5	+ 77.5	+ 83.0		30	+ 52.5	+ 53.0	+ 52.0	+ 52.5
	23	+ 88.0	+ 89.0	+ 92.0	+ 96.5	Oct.	1	+ 54.5	+ 54.5	+ 53.5	+ 53.0
	24	+ 99.0	+ 89.0	+ 99.5	+102.0		2	+ 55.5	+ 60.0	+ 62.5	+ 62.5
	25	+104.0	+104.5	+102.0	+103.5		3	+ 63.5	+ 63.0	+ 59.0	+ 50.0
	26	+103.5	+103.0	+101.5	+102.0		4	+ 31.0	+ 18.0	+ 13.5	+ 17.0

(to be continued.)

Table II. (Continued.)

Time		0 ^h	6 ^h	12 ^h	18 ^h	Time		0 ^h	6 ^h	12 ^h	18 ^h
Date						Date					
Oct.	5	+17.5	+ 8.0	+ 0.5	+ 2.5	Nov.	25	-53.0	-54.5	-55.5	-53.5
	6	- 5.0	-24.0	-20.0	-- 7.0		26	-57.0	-68.0	-85.0	-78.5
	7	+ 1.0	- 4.0	0	+ 8.0		27	-71.5	-67.5	-62.5	-55.5
	8	+12.0	+ 2.0	- 6.0	+ 1.0		28	-47.5	-38.5	-30.0	-24.0
	9	- 4.0	-22.0	-29.0	-21.0		29	-20.0	-17.5	-20.0	-25.0
	10	-11.0	- 5.0	0	+ 8.0		30	-25.0	-27.5	-33.0	-38.5
	11	+15.0	+18.0	+21.0	+23.5	Dec.	1	-31.5	-28.0	-26.0	
	12	+22.5	+18.0	+17.5	+21.5		2				- 2.5
	13	+25.5	+29.5	+33.0	+36.0		3	- 7.0	- 8.5	- 7.5	- 4.5
	14	+39.5	+41.5	+42.5	+45.0		4	- 2.0	- 1.0	+ 2.5	+ 3.5
	15	+48.0	+37.5	+22.0	+21.0		5	+ 5.0	+ 2.0	+ 2.0	+ 3.0
	16	- 3.0	-17.0	-17.0	-12.0		6	+13.0	+ 8.5	+ 7.0	+16.0
	17	+ 2.0	+15.0	+24.0	+33.5		7	+24.0	+11.0	+12.5	+11.5
	18	+42.0	+48.0				8	+ 9.0	+ 6.5	+ 5.5	+ 4.5
							9	+ 3.0	+ 3.5	+ 5.0	+ 4.5
							10	+ 4.0	+ 5.0	+ 4.5	+ 0.5
							11	+10.0	+15.0	+ 9.0	- 6.5
Nov.	5			- 7.0	- 2.0		12	-11.0	-16.0	-21.5	-22.5
	6	- 4.0	-13.0	-17.0	-12.5		13	-26.0	-29.0	-33.5	-35.0
	7	-15.0	-15.5	-11.0	- 5.0		14	-37.5	-39.0	-35.5	-33.5
	8	0	+ 4.0	+ 9.0	+17.0		15	-29.5	-21.5	-15.0	-13.5
	9	+ 4.0	-31.0	-41.0	-32.5		16	-13.0	-11.0	+ 2.0	+13.0
	10	-38.0	-49.0	-54.0	-53.5		17	+16.0	+16.0	+ 7.5	- 3.5
	11	-53.5	-53.5	-45.0	-35.0		18	- 8.0	-13.0	-17.0	-19.0
	12	-30.0	-26.0	-17.5	- 7.0		19	-21.5	-27.0	-32.0	-34.5
	13	-21.0	-44.0	-50.5	-42.5		20	-41.0	-39.0	-36.0	-34.5
	14	-34.0	-36.0	-33.5	-24.0		21	-24.5	-10.0	- 3.0	+ 1.0
	15	-16.5	-12.5	-10.0	- 3.5		22	+ 5.0	+11.5	+13.5	+19.5
	16	+ 2.0	+ 6.0	+ 8.5	+13.0		23	+20.5	+14.5	+13.5	+16.5
	17	+15.5	+15.5	+11.0	+13.5		24	+12.0	+ 9.0	+10.0	+11.0
	18	+13.5	+ 7.0	+ 1.0	+ 4.0		25	+12.0	+ 9.5	+ 8.5	+10.0
	19	+ 8.0	+ 9.0	+10.5	+14.0		26	+ 5.5	+ 4.5	+ 8.5	+15.5
	20	+12.5	+ 9.0	+ 5.0	+ 1.0		27	+15.0	+ 9.5	+10.0	+10.0
	21	0	- 2.0	- 4.5	- 3.5		28	+ 7.5	+ 4.5	+ 4.5	+ 2.0
	22	- 3.5	- 3.5	- 9.5	-10.5		29	- 1.0	- 1.5	- 2.5	- 2.5
	23	-11.5	-16.5	-23.0	-28.0		30	- 2.5	- 4.0	- 3.5	- 4.5
	24	-37.5	-53.5	-67.0	-59.0		31	- 5.5	+ 5.5	+ 4.0	+ 4.5

(to be continued.)

Table III.
Air temperature at noon. (Asama Volcano Observatory)

Date	1936											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
1	+ 0.5	- 5.5	- 3.0	+ 1.4	+11.5	+14.0	+17.4	+27.0	+22.0	—	+ 9.0	—
2	- 1.3	- 6.5	- 3.2	+ 2.0	+11.0	+17.0	+14.5	+23.8	+24.2	+13.0	+ 5.8	+ 6.8
3	+ 2.0	- 4.7	- 2.0	+ 6.8	+13.0	+16.0	+18.5	+20.6	+23.5	+14.0	+ 7.8	+ 3.2
4	- 1.0	- 7.5	- 3.0	+ 3.6	+14.8	+13.0	+18.8	+22.5	+23.0	+14.0	+10.8	—
5	- 1.0	- 5.0	- 3.4	+ 2.0	+15.0	+16.5	+17.2	+22.8	+23.5	+14.5	+ 9.5	- 1.2
6	- 3.0	- 5.5	- 2.5	+ 6.5	+17.0	+15.0	+13.5	+23.3	+25.0	+14.5	+ 6.8	- 1.0
7	- 4.0	- 4.1	- 0.3	+ 9.5	+12.0	+14.5	+13.5	+25.5	+25.0	+13.0	+ 5.1	- 2.3
8	- 3.0	- 5.1	- 4.5	+ 8.7	+10.5	+15.5	+17.2	+21.0	+25.0	+12.5	+ 7.4	- 2.0
9	- 2.5	- 1.0	- 5.5	+ 9.0	+12.0	+13.0	+15.7	+21.5	+24.0	+11.3	+ 5.0	—
10	- 3.5	- 0.1	- 4.5	+ 5.7	+13.0	+13.4	+17.0	+21.5	+24.0	+12.8	+ 1.8	- 2.2
11	- 7.0	- 2.0	- 2.0	+ 4.5	+16.0	+17.5	+18.2	+21.0	+21.8	+14.0	+ 3.5	—
12	- 3.5	- 3.0	- 1.0	+ 1.6	+20.5	+16.5	+20.5	+25.0	+25.0	+10.5	+ 5.4	+ 6.0
13	- 2.0	- 3.2	+ 2.0	+ 0.5	+ 9.0	+19.0	+16.5	+25.3	+21.0	+10.8	+ 5.0	+ 6.0
14	- 2.5	- 1.4	+ 4.8	+ 5.0	+18.0	+19.5	+19.5	+23.5	+23.2	+12.4	+ 5.8	± 0.0
15	- 5.0	- 1.0	+ 1.5	+ 4.1	+17.5	+19.0	+23.0	+22.5	+21.0	+11.3	+10.0	- 3.0
16	- 6.0	- 0.8	- 0.2	+ 5.5	+13.6	+21.5	+25.6	+13.0	+18.0	+13.5	+ 6.2	- 0.5
17	- 8.5	+ 0.5	- 0.3	+ 4.8	+13.0	+23.0	+26.0	+19.0	+14.0	+12.0	+ 6.6	+ 2.7
18	- 6.0	+ 3.2	+ 4.5	+ 6.0	+15.0	+21.5	+21.2	+14.5	+18.0	+11.0	+ 6.6	+ 7.3
19	- 5.0	- 2.0	+ 4.5	+ 9.6	+11.0	+18.0	+26.0	+21.0	+15.5	+ 9.5	+ 5.8	+ 6.5
20	- 5.7	- 2.4	+ 1.0	+10.3	+16.5	+20.9	+23.5	+19.7	+15.0	+ 8.0	+ 2.5	+ 1.0
21	- 5.0	- 5.6	+ 0.6	+12.2	+11.9	+20.0	+23.0	+21.8	+14.5	+11.0	+ 2.5	± 0.0
22	- 5.5	- 5.8	+ 3.0	+ 9.7	+17.0	+25.5	+24.5	+20.2	+18.0	+11.0	+ 2.0	+ 0.8
23	- 5.5	- 6.7	- 2.0	+ 9.8	+14.0	+24.5	+23.6	+21.0	+18.5	+ 6.0	+ 2.0	- 1.0
24	- 6.3	- 3.0	- 4.0	+10.5	+11.0	+21.5	+23.0	+22.2	+18.0	+ 7.2	+ 3.5	- 1.0
25	- 7.7	- 3.0	+ 0.4	+ 7.0	+ 9.0	+23.0	+25.2	+22.8	+19.5	+ 9.3	+ 2.0	+ 0.8
26	- 3.3	- 6.8	- 1.5	+ 9.0	+12.0	+21.9	+26.0	+21.5	+14.0	+ 8.0	+ 1.0	- 2.0
27	- 3.6	- 5.0	+ 4.0	+12.6	+ 8.0	+19.5	+25.0	+23.2	+15.0	+ 9.9	+ 3.8	- 0.5
28	- 3.0	- 5.0	+ 3.0	+10.4	+ 9.0	+16.2	+27.5	+24.0	+21.0	+10.0	—	± 0.0
29	- 1.0	- 3.0	+ 5.8	+ 7.5	+13.0	+18.5	+27.8	+25.0	+13.0	+11.0	—	± 0.0
30	- 4.1	—	+ 1.7	+ 7.5	+11.0	+17.0	+27.2	+26.2	+17.5	+11.0	—	- 1.0
31	- 7.3	—	- 0.2	—	+ 6.5	—	+25.4	+26.0	—	+12.0	—	- 1.5

In Fig. 1 are given the curves for the eruptions, the air temperature at the Volcano Observatory, and the tilts at all three stations, from which it will be seen that the extent to which the tilts varied was very pronounced in February and March, when the eruptions were also frequent. It is worthy of note that the amount of tilt is larger at the Observatory than at the other two stations. The

tilts at the Observatory appeared as early as the beginning of January, that is, a month before the explosion group began its activities

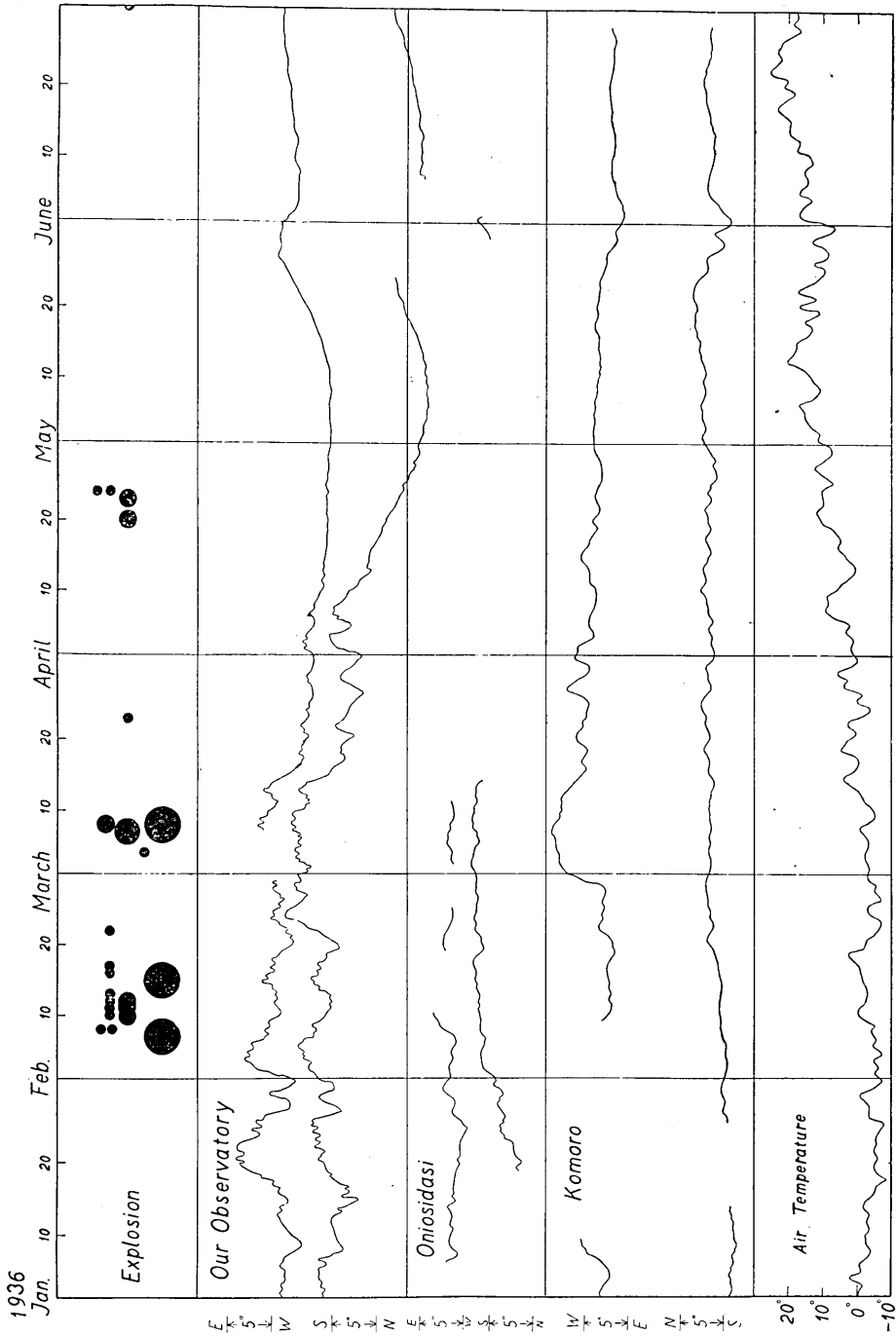


Fig. 1, a. Explosion, Air Temperature, and Tilt observed at Different Stations around the Volcano Asama.

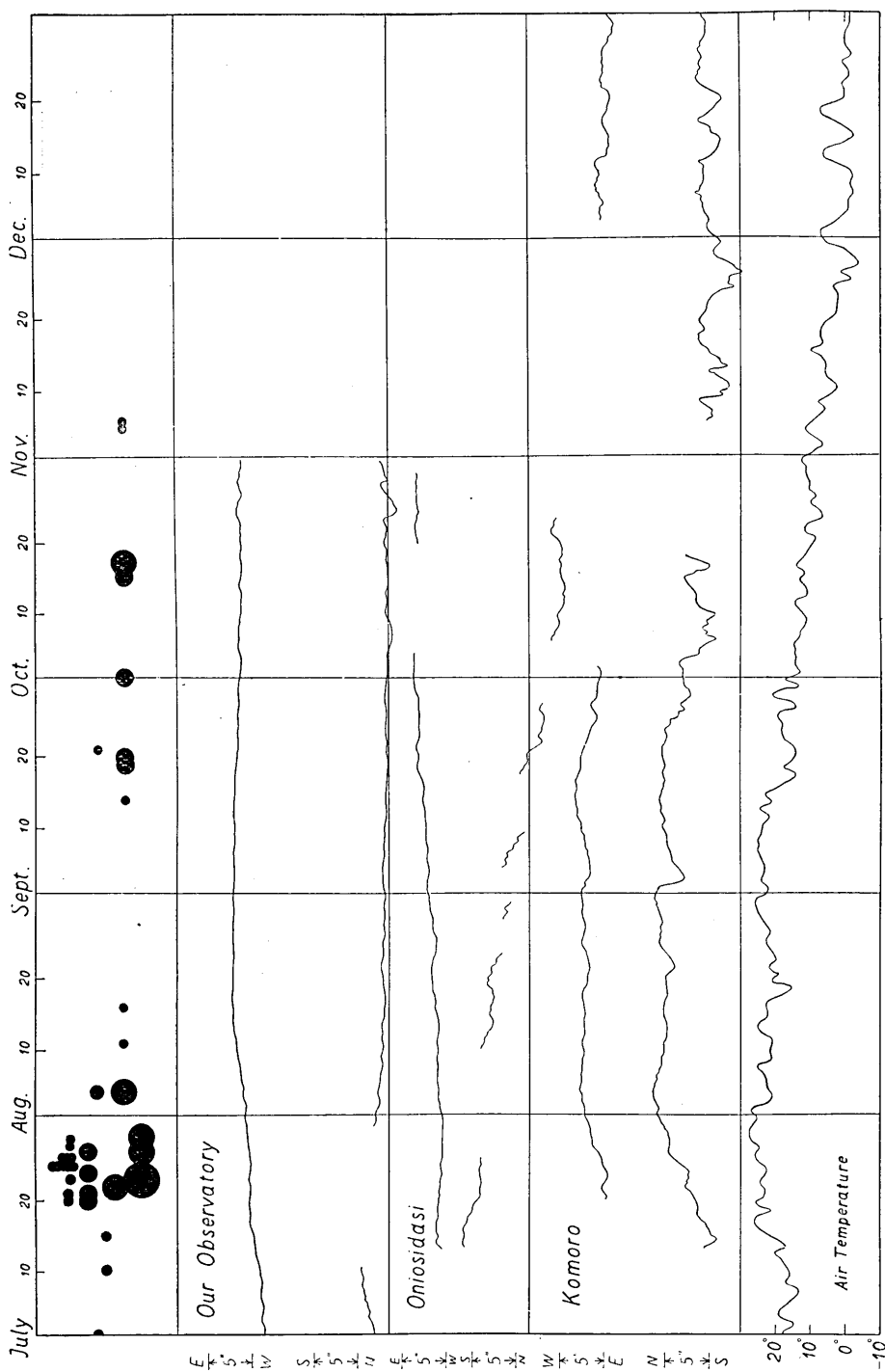


Fig. 1, b. Explosion, Air Temperature, and Tilt observed at Different Stations around the Volcano Asama.

on Feb. 7, while those at Komoro made no marked appearance in connexion with this explosion group, although there was a conspicuous variation amounting to 7" before the explosion group began activities on March 7.

As to the depth of the crater, the rise of new lava had been noticed since October 1935, causing tilts in the ground flanking the volcano, and finally resulting in the explosion groups of February and March the following year.

After these explosions, the tilts gradually calmed down, and in May and June, became very quiet. The activity of the volcano was correspondingly calm in May and June, except for a number of April.

Since the middle of May, however, a gradual but uni-directional tilt kept up till July, pointing to increasing volcanic energy, when violent explosions then came in succession, the first on July 20.

After these activities, the volcano became very quiet again, and remained so till the end of 1936. The tilts were also gentle, merely repeating small variations within restricted limits.

Since, as will be seen from Fig. 1, the observed tilts are quite independent of the air temperature, the tilts described above may all be regarded as being related to the activities of the volcano.

It may be concluded from the present observations that the following relation hold between tilting and volcanic activity. Preceding a volcanic explosion group by from 7 to 30 days, a marked variation occurs in the tilts, which, as the explosions begin, gradually diminish.

Usually the variation in tilt appears simultaneously at the three stations, but is largest in amount at the Volcano Observatory and smallest at Osidasi, which probably is due to the underground structure of the volcano and to the topography of the respective stations. The fact that the tiltmeter room at the Volcano Observatory is an excavation in the huge lava mass, while, in contrast to it, that at Osidasi was originally a natural cave formed by the accumulation of small lava fragments from the lava stream of 1783 may be a cause of this phenomenon.

Generally speaking, Asama is active for 3 years, after which it stays quiet for 3 years, and then gets active again for another 3 years, the cycle being repeated. The explosions that occur in an active period may also be divided into groups, each group consisting of from 5 to 19 successive explosions. Usually, the earlier group consists of severer explosions than those in the later group. In the same way, the tilts connected with the earlier explosion group are larger than those con-

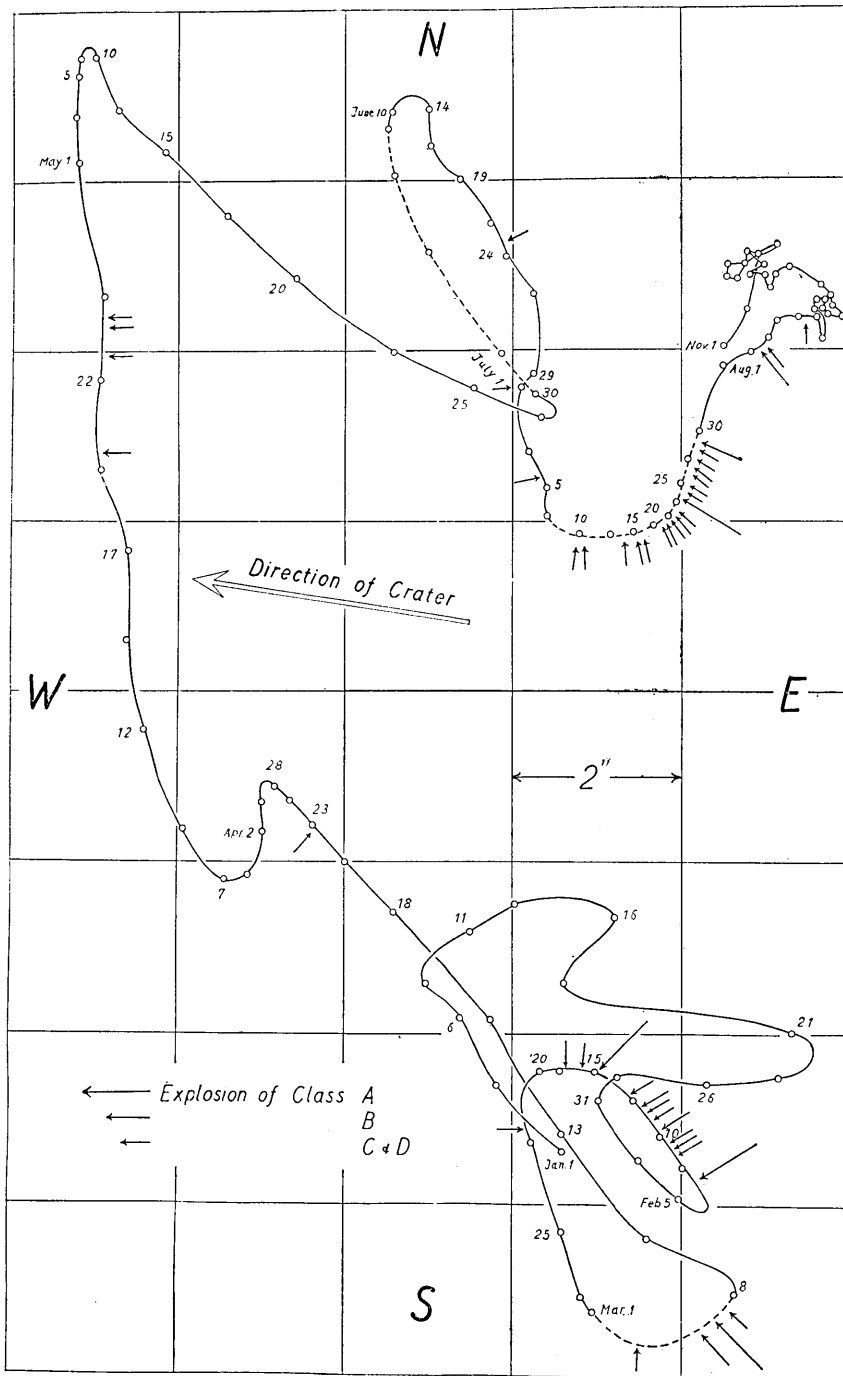
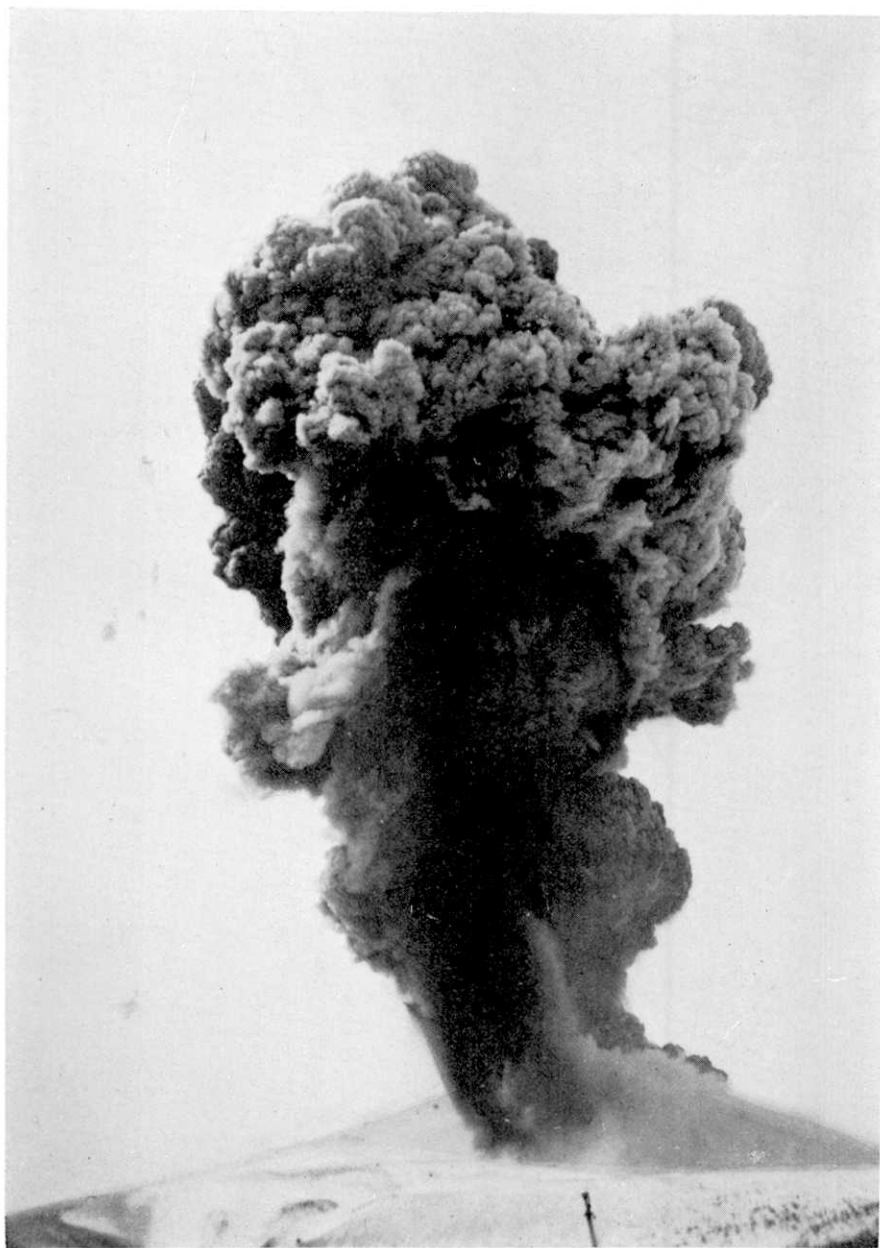


Fig 2. Vector diagram of the tilt variation of the ground as observed at the Asama Observatory. The curve progresses towards the same direction as water on the ground flows 5.



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Fig. 3. The Explosion on March 12, 1937.

nected with the later groups. In fact, the tilt that preceded the explosion group of April, 1935, amounted to as much as 40'', while those that preceded the explosions of 1936 were not so large as this although they were about 5 times larger than the variations observed during periods of quiescence.

It is also notable that the crater bottom begins to rise at the same time as the variations in tilt.

In conclusion the writers wish to express their hearty thanks to the Council of the Foundation for the Promotion of Science and Industrial Research of Japan, with the aid of whose grant the studies at Asama are being maintained.

27. 最近の浅間火山の活動と地表傾斜變化

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浅間火山の活動に著しい地表傾斜變化の伴ふ事は既に報告した事がある。

本報告は火山の周圍 3ヶ所に傾斜計を設置し、昭和 11年の火山活動と傾斜變化とに就いて比較研究したものである。

尙この観測を施行するに當り、日本學術振興會より研究費を支給された事を厚く感謝する次第である。
