THE ERUPTIONS AND EARTHQUAKES OF THE ASAMA-YAMA V : Lists of the Volcanic Disturbances instrumentally registered at the Asama-yama Seismological Stations, 1913 to 1916

THE ERUPTIONS AND EARTHQUAKES OF THE ASAMA-YAMA. V.

[Lists of the Volcanic Disturbances instrumentally registered at the Asama-yama Seismological Stations, 1913 to 1916.]

By

F. OMORI, Sc.D.,

Member of the Imperial Earthquake Investigation Committee.

The tromometer observations at the Yuno-taira (Asama-yama) seismological station has been carried on during the six warmer months, May to October, every year since 1911; and the lists in the following pages form the continuation of those contained in Volume VI, No. 2, of the *Bulletin*, giving for the Asama-yama disturbances, during the four years 1913 to 1916, the date, the time of occurrence, the duration of the preliminary tremor, the maximum double amplitude,* and the total duration of motion. The principal instruments of observation were the same as those used in the previous years, namely, a horizontal pendulum tromometer and a two-component portable horizontal tremor-recorder; the record being taken on the smoked paper whose rate of displacement was usually 1 to 2 cm. per minute, but on several occasions was increased up to 5 to 7 cm. per minute. The orientation of the tremor-recorder, of 100 times magnification, was such that the

* For a greater portion of the 1913 observations (Tables Ib and Ic), the statement of the maximum motion of the eruptive shakings is restricted to the longitudinal component as indicated by the tromometer, on account of the great number of the disturbances in question during that year.

two pendulums registered respectively the movements parallel and normal to the line joining the place of observation with the centre of the volcano, or the apparent longitudinal and the apparent transverse vibrations assumed to proceed from under the crater. The tromometer, of 200 times magnification, was set up so as to record the former component motion.

As before the Asama-yama disturbances are divided into two distinct classes, namely :—A-type motion, or the volcanic earthquakes not directly accompanied by an outburst; and B-type motion, or the shaking of the ground caused by an eruption. The A-type earthquakes consisted of quick vibrations and were generally very short in duration; while the B-type shakings were composed of slow gentle movements and comparatively long in duration. The numbers of the disturbances belonging to these two classes are as follows :—

Year (May–Oct.)	(A) : Earthquakes.*			(B) : Eruptions.			Total Sum.
	Sensible.	Unfelt.	Sum.	Strong Explosions.	Small Outbursts.	Sum.	
1913	6	28	34	25	7101	7126	7160
1914	11	37	48	1	30	31	79
1915	44	65	109	0	0	0	109
1916	64	165	229	0	2	2	231

It will be observed that the eruptive energy was greatest in the year 1913, the number of the outbursts amounting to 7126, of which 25 were strongly explosive. In June, July, and August of that year the violence of the eruptions was such that

* Earthquake shocks whose origins were appreciably distant from the Asama-yama are not included in the tables.

the lava fragments projected from the crater reached, or even got beyond, the ground of the Yuno-taira observatory. Consequently the observation had during the subsequent two months to be carried on temporarily at the lower and safer locality of Ashino-taira. After May 5th, 1914, there has been no strong outburst of the Asama-yama. The A-type shakings or earthquakes, which were very few in 1913, much increased in frequency and intensity in the two years, 1915 and 1916, when the Asama-yama made practically no eruptive manifestation.

The position relative to the centre of the crater mouth of the two seismological stations of Yuno-taira and Ashino-taira, both situated on the Komoro, or W. S. W., slope of the volcano, are as follows :—

	Height Difference.	Radial Distance.
Yuno-taira :	580 m. ;	2300 m.
Ashino-taira :	1130 ;	4850

According to the latest (1912) Military Survey map of the Asama-yama district, the height of the mountain top is 2542 m.

As formerly I must state my obligations to Messrs. J. Nishizawa, J. Kambayashi, J. Tamra, T. Ushiyama, M. Kawazoe, and K. Yoda, of the Nagano Meteorological Observatory, and to Messrs. T. Kato, T. Toyoda, and H. Krosaka, of the Seismological Institute, who took part in the Asama-yama observations with continued zeal; the three last-named gentlemen having also carried on the extremely laborious work of calculating the elements of motion of the numerous disturbances.