

directly or indirectly to the inhabitants of India, and shows how much is gained by effective organisation and cooperation. We could wish that similar co-operation of scientific and technical work existed in all regions, as it already does in some, since it not only favours efficiency and economy, but also provides a useful summary of results obtained, which are often hidden in the administrative detail and statistics of an annual progress report, though they may appear subsequently in a detailed publication.

*EARTHQUAKE STUDIES.*

THE last two bulletins of the Imperial Earthquake Investigation Committee (vol. iv., No. 2, and vol. v., No. 1) are each from the pen of Dr. F. Omori.

The second memoir deals with the eruption of Mount Usu, in Yezo. This began at the end of July, 1910, and resulted, amongst other things, in the formation of about fifty craterlets parallel to a lake shore. The highest of these was about 700 feet. As these were formed, not only did the shore of the lake rise, but there was a rapid upheaval of ground to form a new mountain. This approximately reached to the same height as that of the craterlets, when its growth suddenly ceased. A curve of barometric pressure and another of earthquake frequency in the vicinity of the mountain, but prior to its eruption, shows that premonitory shocks began when atmospheric pressure was least, and that the first volcanic explosion occurred when it was at a maximum. The frequency of volcanic after-shocks does not appear to

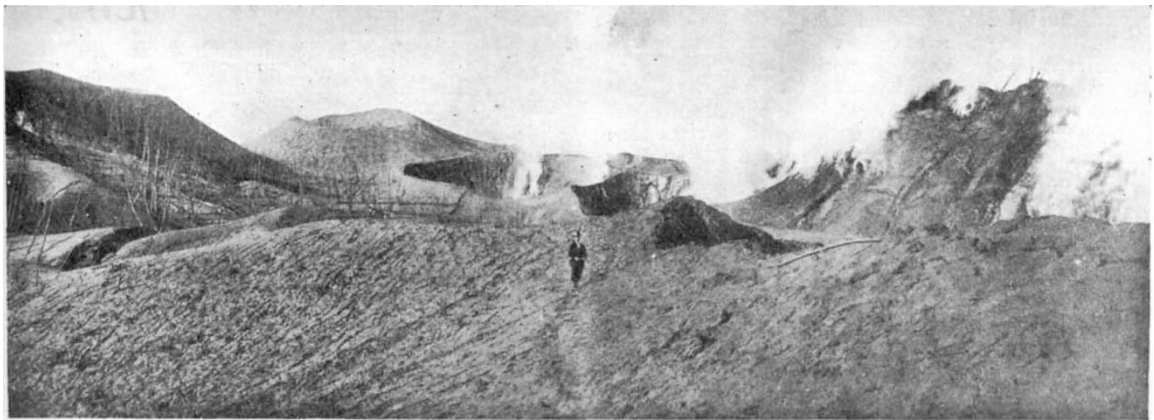


FIG. 1.—The Craterlets Group opposite the New Mountain, seen from the east. The cone at the extreme left end is the "Taka-Ana," and that at the right side is the "Fuji-Yama." To the right-hand side of the figure is shown the inside, or the dislocation plane, of the "New Mountain."

The first relates to the vibrations of railway-bridge piers and trusses. The period of transverse and longitudinal vibrations of piers 82 feet in height was found to be from 0.2 to 0.4 second. As this is much shorter

have followed that which is usually followed by the after-shocks of a large earthquake. Dr. Omori points out that there are many instances in Japan where volcanic eruptions have been preceded by numerous



FIG. 2.—General view of Usu-san from the north-east. The Usu dome rises at the left-hand side with the E. Maru-yama at its right base. The "New Mountain" is at the right side of the figure.

than that of a destructive earthquake which is from 1 to 1.5 seconds, the inference is that in a great earthquake these piers would be expected to fracture at their base.

earthquake shocks and "jinaris" (earth-sounds). Whenever this is the case, tromometer and seismograph observations should give warning of an approaching outburst. J. MILNE.