THE JAPANESE EARTHQUAKE OF SEPTEMBER 1, 1923

A PRELIMINARY report by Prof. A. Imamura, the first issued by the Imperial Earthquake Investigation Committee, has been published in the *Seismological Notes* of that committee and is abstracted in *The Geographical Journal.* Most of the instruments in the Seismological Institute at Tokyo were wrecked or dismantled by the first shock. Of the whole number, only one component of one seismograph registered the movement from beginning to end, an interval of two hours and twenty minutes, but within ten minutes from the first vibrations four seismographs were sufficiently repaired to continue their useful work, and others were added in the following days. Though few recorded more than the first tremors, these happened to be the most important, for, from the direction of the earliest vibrations and the duration of the preliminary tremors, the position of the epicenter was found to be in lat. 34° 58′·6 N., long. 139° 21′·8 E., or under Sagami Bay, and the depth of the focus to be roughly 15 kms. The survey of Sagami Bay, repeated by the Imperial Hydrographic Service, showed that an area of 700 sq. kms. had been depressed on an average by 39 fathoms, and another area of 240 sq. kms. raised on an average by 45½ fathoms. These movements naturally gave rise to seawaves, which along the shores of Sagami Bay reached heights of 8, 9 and even 12 meters, and the remarkable feature of these waves was that the directions in which they advanced showed that the largest waves came from the areas of elevation, while those that came from the areas of subsidence were comparatively small. The great earthquake came without any warning fore-shocks, though four very slight shocks were registered at Tokyo during the preceding month, all of which had origins within or near Sagami Bay. The after-shocks, as usual, were very numerous, partly on account of the large focal area, partly because the first shock was followed in less than fifteen hours by another almost equally severe in a different part of the same seismic zone. During the first month, the total number recorded at Tokyo was 1,256, of which most of the strongest took place in the Sagami Bay area, though others originated within and to the southeast of the Bo-so peninsula, and also in a district to the north of Tokyo.

THE NEW SEISMIC STATION AT FORDHAM UNIVERSITY

THE new seismological observatory at Fordham University was dedicated on October 24. The building housing the seismographs is one of the few in the world devoted exclusively to this work, and the lately acquired "Milne-Shaw" seismograph installed there is the only one of its type possessed by any Jesuit observatory. It is the third of its kind, however, to be sent to this country. The building itself was erected by William J. Spain, of New York, in memory of his son, who was a student at the university, and died during his sophomore year.

The Milne-Shaw seismograph embraces practically all the advantages of the most sensitive type of apparatus, avoiding many mechanical complications, by reason of the method of direct photographic registration which it employs to reduce the motion of the earth to a graphic form.

It is this instrument that occupies the place of importance in the new building erected at Fordham for the study of earthquakes, although the edifice also contains other piers accommodating instruments of lesser sensitivity. Mr. F. W. Sohon, S.J., who was responsible for the detailed design of the interior, took into consideration the future development of the station and the large masonry pier on which the new seismograph stands is built to hold three instruments, two of the type already explained and a third known as the "Galitzin" vertical seismograph. When the station possesses these three machines not only the distance but the actual direction and specific location of the quake can be determined from this station, unaided by data from other sources. The reason for the three machines is the recording of the motion of the earth in three different directions, or rather the resolution of the motion of the earth into three components, one instrument recording the north and south horizontal motion, a second the east and west horizontal motion and the third the vertical motion of the earth.

The pier on which these instruments are to stand reaches to a depth of twenty-five feet, and is erected on bed rock; it is freed from local and artificial disturbances by a space between it and the floor of the building. The room in which it was erected is entered only by passing through an ante-room, from which visitors may view the installation through plate-glass windows. Beyond the instrument room proper is a photographic dark room and work shop for the development and interpretation of the records.

A special thermostat automatically controls the temperature of the building, keeping constant in all weathers, to within one degree. There is also a wireless installation in the building and the time signals received twice daily from Arlington are recorded directly on the seismograms, making the determination of the arrival of a quake accurate to less than one second. Communication by cablegram has been established with Professor Turner, of Oxford University, England, so that verification of data observed at both stations may be had in the shortest possible time.