Bulletin of the Seismological Society of America. Vol. 59, No. 1, pp. 459–472. February, 1969

THE LUZON EARTHQUAKE OF 1 AUGUST 1968: A PRELIMINARY REPORT

By Sergio S. Su, S.J.

An earthquake of magnitude 7.3 (M_S, USCGS) occurred along the eastern coast of Luzon, Philippine Islands, at 20h 19m GMT on 1 August 1968, with its epicenter at 16.5°N and 122.2°E and focal depth at 36 km (USCGS). From the map of Figure 1, the epicenter is on land, some 50 km north of the town of Casiguran, and appears to be situated along a north-south trending fault. This fault is a thrust, with its overriding side on the west.

Very soon after the earthquake, the Manila Times newspaper and the Philippine Weather Bureau sent reconnaissance teams into the epicentral area north and west of Casiguran. However, because of the general inaccessibility of the region due to lack of roads, the survey could not be carried out in any satisfactory detail. Among the more notable landscape changes observed was the apparent uplift of a river bed by several meters, extending in length about 80 meters. This caused the river to change course. Within the epicentral region, particularly in the vicinity of Casiguran, fissures were observed in many places, some extending over a kilometer long, with vertical displacements of about two meters (see Figures 3 and 4). However, none of these fissures have been established as fault displacements; they rather appear to be slump fissures.

Intensity within the radius of 50 km around the epicenter was VIII on the Rossi-Forel Scale (See Figure 7). Elsewhere on the island of Luzon intensity ranged between IV and V. The City of Manila, however, though situated 240 km from the epicenter, had a higher intensity of VI because of its alluvial subsoil conditions. Quezon City, Pasay City, Makati, and other cities adjoining Manila felt an intensity of V. Damages in these suburban cities were relatively slight. Only a few re-enforced concrete buildings had broken windows and sheared columns and walls. Major damage occurred within Manila proper, and this, within a relatively small area comprising most of downtown Manila and the old walled city (see Figure 8). A statement made by a German geologist, Dr. Voss, that this area of maximum damage rested on a sinking graben touched off a controversy with local geologists who maintained that the area was merely a former delta of the Pasig River. Within this area, several re-enforced concrete buildings sustained apparently irreparable damage. A 7-story building (the Premiere Hotel and Aloha Theatre) has since been completely torn down. Another building (The Philippine Bar Association Building, 6-stories) had its first-floor pillars twisted and bent into S-shapes, while the upper floors remained intact (see Figures 5 and 6). Salvage Engineers planned to jack up the entire building to rebuild the ground floor. The major catastrophic event that preoccupied Manilans for many days was the complete collapse of a 5-story concrete building (Ruby Tower Apartments). In the early hours of the morning when the earthquake jolted the city (local time: 4:19 a.m., August 2), some 600 tenants were buried beneath the rubble of Ruby Tower. Rescue work lasted for about ten days. Even as late as the fifth day, two little girls, still alive, the last of the survivors, were uncovered from the ruins. The total count of deaths at this site was 329. From the engineering aspect, a fuller account of damage to buildings in Manila may be found in the reports of the UNESCO reconaissance team, which made a ten-day survey of the city. The team was made up of Dr. S. Omote, seismologist, Dr. Y. Yoshimi, soil specialist, Dr. Y. Osawa and Dr. R. Skinner, both earthquake engineers.

From 1589 to the turn of the present century (1899), destructive earthquakes causing severe damage in Manila numbered about 11 (Repetti, 1946). Since 1900, however, Manila experienced only one such earthquake, with intensity (about VI) comparable to the August 1, 1968 earthquake. This was on August 20, 1937, at 8:00 p.m. local time. Epicenter was on Alabat Island, 110 km southeast of Manila (Selga, 1937a and 1937b). At that time, only one strong aftershock was felt within the space of an hour following the main shock. In contrast to this, in the aftershock sequence following August 1, 1968, there were at least 19 aftershocks that were felt in Manila with various intensities (see Table 1).

The foreshock sequence was very sudden and short. On the records of Baguio, about 170 km from the epicenter of the main shock, there were more than 10 foreshocks in the 24-hour interval preceding the main shock. However, for the previous 24-hour period, there was almost a complete quiet.

A rather interesting feature of the aftershock sequence is the presence of a secondary sequence, a phenomenon still believed to be of rare occurrence. This sequence (see Table 2) started with a