FIGURE 49.—Head of large landslide (shown by arrow) in the Barranco de las Guacamayas, Guatemala City.

FIGURE 50.—A marble statue thrown 40 cm from its pedestal; it is 120 cm high, weighs approximately 200 kg, and is located in Zone 10 in Guatemala City.

assumed to be $\mu = 3 \times 10^{11}$ dyne cm^{-2}, and $\bar{u} = 100$ cm; then,

$$\Delta\sigma = 3 \text{ bars.}$$

To verify the above stress-drop determination, the seismic moment M_0 and the energy E (Brune, 1968), defined by

$$M_0 = \mu \bar{u} A \tag{5}$$

and

$$E = \sigma \bar{u} A, \tag{6}$$

are combined to obtain σ

$$\sigma = \frac{\mu E}{M_0}. \tag{7}$$

Assuming μ and $\bar{u}$ as given above and A, the dislocation area, to be 300 km in length and 20 km in width (assumed, Brune, 1968, table 2), $M_0 = 1.8 \times 10^{27}$ dyne-cm. Using E, determined from equation (3) to be 1.1×10^{21} ergs, and substituting these values in equation (7), one obtains $\sigma = 18$ bars.

From the above computations, it seems that the February 4 earthquake was a low-stress-drop earthquake. Independently, Dewey and Julian (this report) have found $\Delta\sigma = 6.6$ bars, using information determined from the spectral density of G-waves.

Using a Modified Mercalli intensity rating of VII for Guatemala City with an epicentral distance of 157 km, one determines the particle horizontal velocity (Espinosa, unpub. data, 1975) from

$$\log \dot{x} = 1.27 - 0.79 \log \Delta + 0.16 I_{\text{mm}} \tag{8}$$

to be 4.5 cm/s, where Δ is the epicentral distance in kilometres and I_{mm} is the Modified Mercalli intensity rating. If, instead of the epicentral distance, one uses the distance from the causative fault to Guatemala City (25 km), then one obtains a maximum particle velocity of 19.3 cm/s. The above quantities give an indication of the level of ground motion of the main event experienced in Guatemala City.

An earthquake similar to the Guatemala earthquake was the Varto-Ustukran earthquake of August 19, 1966, on the Anatolian fault system in Turkey (Ambraseys and Zátopek, 1968; Wallace, 1968), and data obtained from it are very similar to the observations made by the authors after the Guatemalan earthquake. These two earthquakes are strike-slip faults, the former right-handed and the latter left-handed. In terms of fault displacement, magnitude, and length of faulting, the February 4 earthquake is similar to the November 26, 1943, Turkish earthquake, which had a magnitude of 7.6, a length of rupture of 280 km, and a relative horizontal displacement of 110 cm. The February 4 earthquake had a magnitude of 7.5, a length of rupture of 240 km, and an average relative horizontal displacement of 100 cm.