



FIG. 9.—Number of shocks within 75km of the trend line between 1955 and 1964. The magnitude ranges have the stated figure as their lower bound.

Each of the maps shows an appreciable change in the density of epicentres in the vicinity of the trend line. This line also appears in a study of the Main Seismic Region by Hamilton and Gale (1968, fig. 3), which is based upon a limited number of computer-determined epicentres between January, 1964, and June, 1965. They are of high individual accuracy, but the differences between the separate figures in the present paper suggest that the period covered by Hamilton and Gale is too short to establish permanent features of the seismicity pattern.

A histogram including the shocks below magnitude 4 shows an even sharper boundary than the one shown in Fig. 8. The predominance of the activity in the northern region holds for all magnitudes, but when the number of shocks is expressed as a fraction of the number having magnitudes from 4 to 4.5 the distribution of energy among shocks of different magnitude is seen to be very similar. This might be regarded as a reason for considering the shocks to belong to a single region, but probably it indicates only that the shocks of both regions result from similar causes.

LARGE EARTHQUAKES

The belief that a tectonic boundary exists in this region is strengthened by the occurrence of several large earthquakes in the vicinity. The concentration of major shocks at the boundaries of seismic regions has been noticed elsewhere. For example, Koridalin *et al.* (1961, p. 158, translated from the Russian), discussing earthquakes in the U.S.S.R., state: "Another characteristic that was noticed almost everywhere is the location of the large earthquakes on the periphery of the zone of epicentres established by the small shocks."

In this part of the South Island shocks of magnitude 7 or more occurred in 1888, 1901, 1929, and 1968. The accepted epicentre of the so-called Arthur's Pass earthquake of 1929 lies to the south of the suggested boundary, but it is the most uncertain of the set. The felt area of the Cheviot earthquake of 1901 was well determined, and surface faulting at Glynn Wye makes the epicentre of the 1888 shock reasonably certain. For the Inangahua earthquake in 1968 excellent instrumental coverage was available.