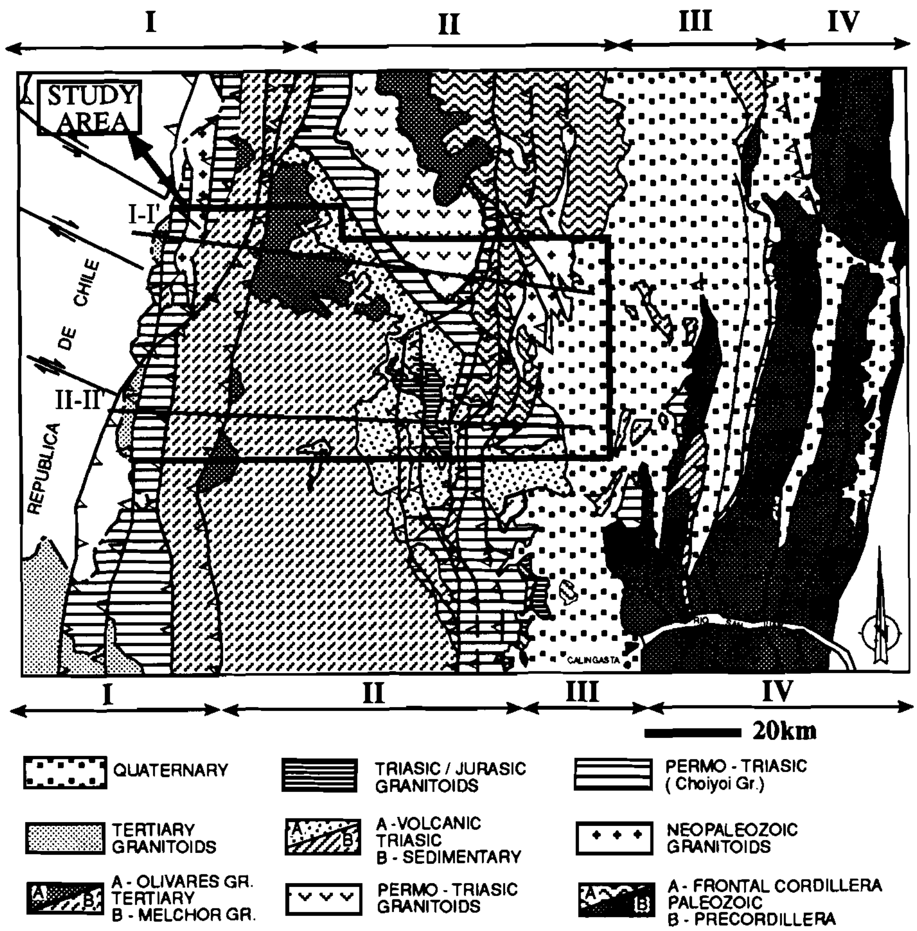

Fig.1.- Geological sketch map with location of study area. I-Principal Cordillera. II- Frontal Cordillera. III- Rodeo-Calingasta Basin. IV- Precordillera

Although it was not possible to restore the Gondwanic deformation, we were able to estimate the shortening of some minor structures. The calculated shortening is up to 70% in some duplex structures in the Atutia river area using a bed-length balance method. The calculated shortening must not be too different from the regional shortening generated by the Gondwanic deformation.

The Andean Orogenic Cycle

The Andean Orogenic Cycle (Ramos, 1988) is the ultimate responsible of the tectonic construction of the Andean Cordillera. In this cycle we can distinguish two main stages: the first one is an extensional tectonic episode, starting in upper Permian and concluding in the lower Cretaceous; the second one is a compressional tectonic episode, which goes from the upper Cretaceous to the Quaternary.

The extensional stage

In the upper Permian starts an important extensional stage, which generates a significant volcanism (Choiyoi volcanic episode). From the Triassic to the lower Jurassic, this process accelerates, but it slows down in the rest of the Jurassic and the lower Cretacic, and the first marine deposits appear. The deposition area and the Mesozoic sedimentation depocenters migrate to the W, conditioned by the extensional deformation migration in the same direction.

The structures related to the Andean extensional tectonic process are normal faults grouped in bands with a N-S direction (fig. 1). Sometimes we can find normal faults with a NO-SE direction, which represent transfer zones.

The normal faults are listric, mergin to a common detachment level dipping to the W. In the cross section I-I' and II-II' (fig.2) we can observe the Andean extensional prism geometry, with the

Gondwanic basement dipping to the W, and at the same time, each fault-block dipping to the E. This geometrical configuration defines a half-graben model and determines the existence of an important Gondwanic basement outcrop in the E of the studied area (Tocota Horst). We must remark the presence of Jurassic sediments in the W side of the Cortadera Fault (fig. 2). This fact shows that the Cortadera Fault represents the limit between the two main paleogeographical and structural domains of the Andean Cordillera in this area: the Cordillera Frontal and the Cordillera Principal.

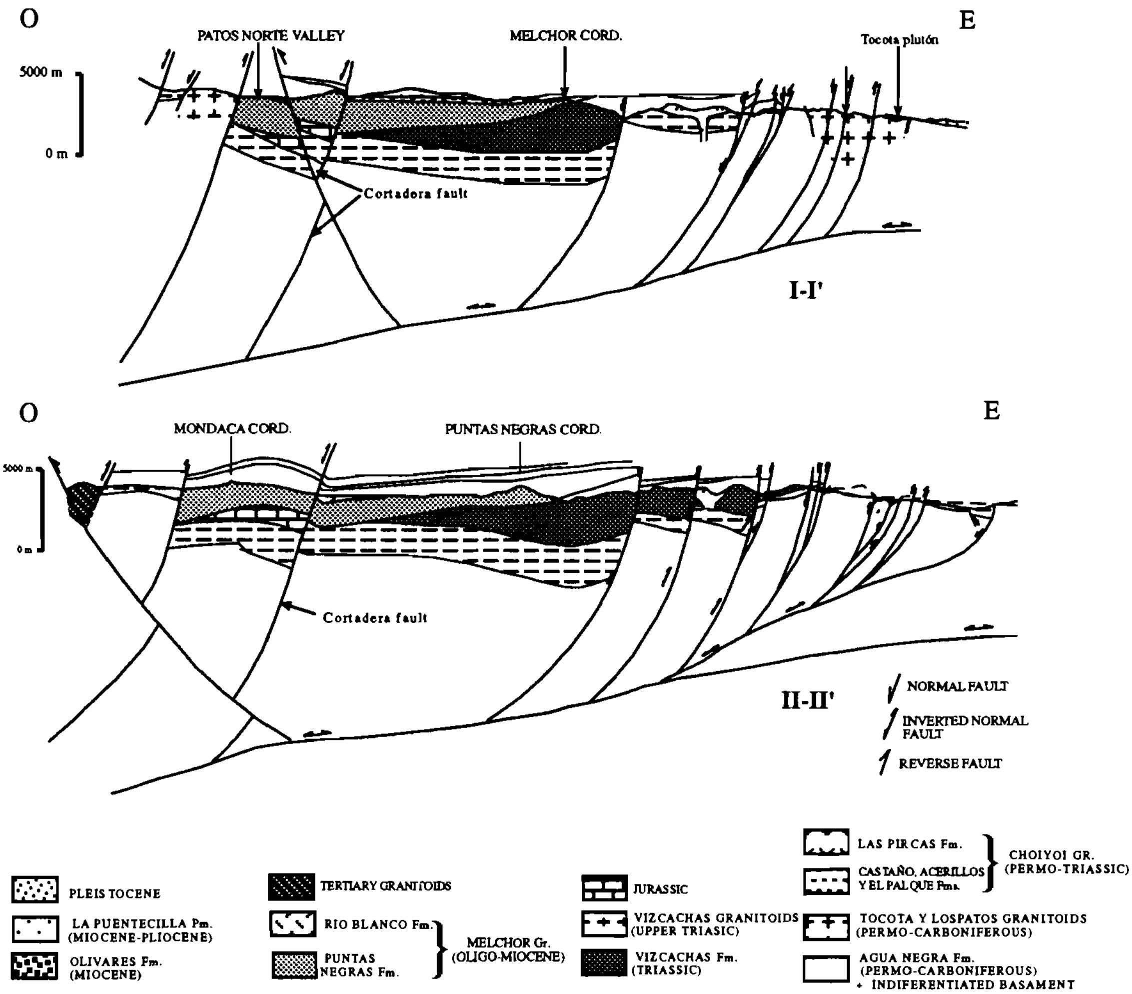

Fig. 2.- Geological cross sections. For location see Fig. 1.

The compressional stage

The Andean compressional stage starts in the upper Cretaceous in the same latitude in Chile (Legarreta and Uliana, 1991). However, in the studied area, it probably starts in the Oligocene, which is the age of the first synorogenic sediments (Melchor Group). The Melchor Group lays unconformabily over the preorogenic successions and the Gondwanic basement (fig. 2), and its depocenters migrate from the W to the E, opposite to the extensional stage depocenters. The geometrical configuration of the Melchor Group is determined by the extensional structure and the erosion surfaces developed over the different fault-blocks from the Jurassic to the Oligocene. In the upper edge of the fault blocks the Melchor Group rests on the lower Andean units (cross sections I-I' and II-II', fig. 2); and in the E of the studied area, it even rests on the Gondwanic basement.

The most important compressional structures are reverse faults and thrusts, and scarce related folds. Most of the faults are generated by the inversion of the extensional faults during compressional tectonics process. However, some faults formed later cut the pre-existing faults (fig. 1 and 2). The observation of different kinematic markers shows an East tectonic transport direction for the Andean compressional structures.