Lateral migration within two converging shear zones. We also consider the evolution of Maxwell Montes during strike-slip faulting without large-scale rotation but accompanied by shear along the northern and southern boundaries (Figure 13*c*), as suggested by the different senses of shear observed along the northern and southern zones of Maxwell. The right-lateral sense of shear along the northern shear zone and the left-lateral sense of shear along the southern shear zone suggest that we should consider a model in which the shear zones are essentially fixed in space and deformation occurs within a wedge-shaped zone whose apex is to the west and which opens to the east. If the direction of deformation is along a bisector of the angle of the wedge, then strike-slip deformation along faults oriented in the same direction as the CSDs would be right-lateral, and features and structures would be faulted and shortened without significant rotation. The evolution of crustal materials moving within two converging fracture zones has been discussed for the Gorda plate on Earth [*Bolt et al.*, 1968; *Wilson*, 1986; *Stoddard*, 1987]. The lateral movement of materials between converging fracture zones acts to produce compressional stresses perpendicular to the direction of motion, across the fracture zones. *Wilson* [1986] and *Stoddard* [1987] both suggest that these stresses could produce strain in the crust across the fracture zones; one way to accommodate this strain would be by strike-slip faulting which shortens crustal material in a direction perpendicular to the fracture zones. This configuration and geometry are consistent with the features and sense of offset in Maxwell Montes. We suggest that a similar mechanism may have been involved for the Maxwell Montes shear zones. As in the terrestrial model, we envision the areas outside the shear zones as "stable" crustal blocks, between which crustal materials were transported laterally. During this phase, the greatest principal stress axis would be oriented perpendicular to the strike of the ridges and the minimum principal stress axis would be vertical. In order for strike-slip faulting to occur as observed, the greatest principal stress must have been parallel to the strike of the ridges, and the minimum principal stress must have been perpendicular to the ridges in the horizontal plane, while the intermediate principal stress axis was vertical. As the orogeny continued and proto-Maxwell Montes grew within the converging shear zones, the topography would have increased to produce a greater vertical load. We suggest that strike-slip faulting occurred once proto-Maxwell Montes had thickened enough to produce a nonhydrostatic vertical load in excess of whatever residual E-W compression existed.

The strike-slip movement of the crustal domains in Maxwell Montes is identical to that discussed for rotating crustal blocks by *Garfunkel and Ron* [1985], except that the primary rotation has been inhibited by the shear zones to the north and south. The deformation is accommodated by a combination of large-scale offset and small-scale internal deformation along the strike-slip faults and shear deformation along the northern and southern boundaries of Maxwell Montes. The lack of large-scale deformation within the crustal domains suggests that the upper portions of these blocks were relatively strong during the strike-slip offset and that this offset accommodated the majority of the strain. It is expected that such offset would be acompanied by more evenly distributed deformation at depth, where the rocks there are more ductile, as *Garfunkel and Ron* [1985] suggest for Earth.

A recent study [*Vorder Bruegge and Head*, 1989*b*] supports the interpretation that east-west convergence is the dominant process affecting Maxwell Montes and the area to the east. Westernmost Fortuna Tessera exhibits evidence of large-scale compressional deformation and crustal thickening in the form of high topography and north trending ridges and valleys for hundreds of kilometers to the east of Maxwell Montes. These observations indicate that east-west convergence is not restricted to Maxwell Montes.

Using the geometry of the converging shear zones, the configurations of Maxwell Montes and proto-Maxwell Montes, and assuming no rotation of the domains relative to the shear zones, it is possible to estimate the maximum westward distance travelled by the domains within the shear zones (Figure 13*c*). On the basis of this reconstruction (Figure 13*c*) we suggest that Maxwell Montes could have originally occupied a position as much as 1000 km to the east. We interpret the observed features and structures to suggest that during the transport of Maxwell Montes to the west it was wedged between the two converging shear zones, causing the reorientation of the maximum principal stress to a more north-south configuration. The mapped shear zones strike N60°E and N80°E, suggesting lateral movement within the shear zones along a trend of approximately N70°E, approximately the same trend necessary to produce compressional ridges on Maxwell Montes that strike N20°W-N40°W. This suggestion is consistent with no rotation of the domains during westward transport since the presently observed ridges on Maxwell Montes strike approximately N20°W-N40°W, as would the ridges on proto-Maxwell Montes. In addition, if compression then occurred perpendicular to these shear zones, then the axis of compressional stress would shift to N20°W, indistinguishable from the N25°W trend inferred from the strike of the cross-strike discontinuities.

As in the other models, this lateral transport and strike-slip faulting would have produced the offset of large-scale linear and curvilinear features such as ridges, valleys, unit boundaries, and topographic contours (Figure 11). In addition, other features off the mountain range could have been produced during this large-scale lateral transport. One such example is the addition of relief along the shear zones, due to the convergence of the crustal blocks undergoing strike-slip movement. *Stoddard* [1987] showed that the convergence of crustal materials within two oblique shear zones results in the "piling up" of material along the fracture zones. For example, a linear topographic high resulting from such a process is observed along the Mendecino Fracture Zone on Earth [*Stoddard*, 1987]. A similar increase in topography is observed along the two shear zones for distances of up to 500 km to the west of Maxwell Montes (Figure 1*c*); these are the linear "rises" which could alternately be linked to the NNW-SSE convergence suggested in the model of Figure 13*a*.

The coincidence of the strike of the ridges and the trends of the shear zones may favor the hypothesis that these features are intimately linked by a single continuous process of ENE-WSW crustal convergence within the shear zones. The shear zones would thus represent a genetic link between the present Maxwell Montes (Figure 2) and the Akna-like proto-Maxwell Montes (Figure 11). From the geometry of the shear zones and the present and reconstructed Maxwell Montes and assuming no rotation of the CSDs, it is possible to place proto-Maxwell Montes within the shear zones at the location where strike-slip faulting would have commenced (Figure 13*c*). With no rotation assumed during transport, the strike of the ridges remains perpendicular to the transport direction and compression. The 30% shortening of the length of Maxwell Montes, from 1200 to 800 km, is equivalent to 1000 km of horizontal offset