from a large block of material, small variations in physical properties could occur, thus affecting the calculations.

In addition to these factors, the intrinsic properties of these materials may change due to electronic realignments or phase transformations due to the high pressure. These factors are presently under investigation. Although the changes detected in the slopes of the ultrasonic velocities of γ and γ_2 are not sufficient to determine whether phase transitions are actually occurring at high pressure, such transitions appear possible based on structural considerations and will be discussed later.

The elastic properties of primary importance are those at atmospheric pressure. It is evident from Figures 2, 3 and 4 and Table 2 that the elastic constants of γ_2 are considerably less than those of γ and γ_1. The γ_2 phase is a much more compressible material than either γ or γ_1, and γ_2 is less resistant to shear forces than γ or γ_1. As a result, the resistance of a mixture of these three phases, i.e., dental amalgam, to externally applied forces will be reduced by the presence of γ_2.

The differences between the elastic constants of these alloys can be explained on the basis of the differences in their structures.

γ-Ag_3Sn

Ag_3Sn is an intermetallic compound with strong interatomic bonds. Compounds with strong bonding are generally brittle, do not suffer plastic distortion, and are relatively incompressible. Hence, the interatomic bonds in the Ag_3Sn structure give the material relatively high bulk, shear and Young's moduli.

γ_1-Ag_2Hg_3

γ_1 belongs to that series of structural types of alloys which occur when particular ratios of valence electrons to atoms are reached, in this case,