INTRODUCTION

The elastic constants of metals with valence two and three present an interesting and unreconciled theoretical problem. It seems clear that the proximity of the Fermi surface to the Brillouin zone boundary will produce effects in the elastic property which are very large compared with the same effects in monovalent metals. Many details of the complex Fermi surface of these metals have recently become available from several modern techniques. Before these results were available, an older and far simpler view of the electronic structure had been used, initially by Leigh[1], in the interpretation of the experimental elastic properties of aluminum[1], magnesium[2,3,4] indium[5] and beryllium[6]. This simple model is reasonably successful in accounting for the elastic properties of these metals but it does not seem possible to reconcile it with the now known complex structure of the Fermi surface, except possibly in the case of magnesium.

The effect of pressure on the elastic constants of aluminum and magnesium[7] has been studied and plausibly interpreted in terms of the simple model with some advance in understanding. Cadmium is a metal with the HCP structure like magnesium and beryllium but with an anomalously high (c/a) ratio. The