constants, fall below a linear extrapolation of the expected values for ideally dense samples. Spherical alloy amalgams did not exhibit evidence of porosity at low pressures after pressure cycling.

A theoretical estimate of the porosity present in the 50% Hg, micro-cut alloy, amalgam can be made by comparing the Young's modulus measured near atmospheric pressure with the values obtained by extrapolation from the high pressure values. In the case where closed pores in a continuous material are assumed, the effective Young's modulus can be estimated by using Coble and Kingery's form of the equation above since A = 0.9 also for a material where $\nu = 0.35$. Applying this equation to the 50% Hg, micro-cut alloy, one obtains a calculated porosity of 2.3%; assuming interconnected pores, and a value of n = 2.6 as for Cu, results in a calculated value of 1.8% porosity using Mc-Adam's equation. These values compare well with the relative volumes of porosity measured in dental amalgam by Jorgensen and Kanai.[16]

Comparison of the Young's moduli measured in this experiment to those obtained by Dickson and Oglesby[4] shows that the values obtained for Young's modulus of amalgam in this experiment are about 10%-15% higher. Although some of this difference can be attributed to differences in sample composition and manipulation, a major factor is probably the presence of porosity in their samples since the effects of porosity were removed at high pressures in this study.

SUMMARY

The elastic constants of dental amalgam have been measured as functions of pressure in the range 0-50 kilobars. High pressure studies were needed so that the elastic behavior measured represented that of an ideally dense material.