DISCUSSION

A determination of an elastic constant by the ultrasonic pulse-echo method involves many phases at each of which small errors may be introduced, and the question arises as to the accuracy of the final figures obtained. The purpose of this work was to obtain an estimate of the accuracy of the complete measurement system under practical measurement conditions.

One could proceed by trying to determine the uncertainty introduced at each stage and then making a calculation of the overall average error. This procedure was not used in this work; on the contrary a direct estimate of the overall error was obtained by inter-comparison of several constants arrived at by different routes starting from different crystals. This evaluation encompasses all sources of error ranging from actual crystal perfection to those generated by the combination of observations, and automatically includes errors due to such effects as crystal orientation, reflections in the transducer, seal thickness, length measurements, dial setting, and electronic variations in the timing standards. Certain sources of error affect all the data by the same fractional amount and are therefore not observable in this evaluation; these are the absolute lead screw error in the length micrometers. The