Introduction

While the science and engineering of rock mechanics have advanced rapidly in the last two decades, there is a basic need to establish techniques for measuring *in situ* properties of rock which can be employed with confidence in engineering design. Some standardized test procedures for laboratory testing of rock properties have been adopted, and one of their primary uses is to make it possible to compare data from different laboratories. One of the major problems of rock mechanics has been the useful application of laboratory data to behavior of rock in place.

The first ASTM Symposium on *in situ* measurements *(STP 477, Determination of the* In Situ *Modulus of Deformation of Rock)* in 1969, presented a review of methods in use at that time, and it was the opinion of many of those present that the experience with various techniques was insufficient to justify the standardization of existing methods.

The second Symposium recorded herein was organized to furnish a state-of-the-art report to 1972 on field testing and instrumentation of rock, not only for exchange of information among scientists and engineers interested in this field, but to lay further groundwork for future standardization of the several types of field tests which are being employed effectively in practice. Emphasis in the papers is upon methods and instrumentation rather than data and rock mechanics theory.

New methods of testing have been devised and more effective instrumentation developed, as well as new insight generated into the meaning of field measurements. In the further development of *in situ* techniques it will be necessary for efforts to be closely coordinated with theoretical developments, finite element calculations, and practical applications. This will make it possible to bridge some of the gaps which exist between laboratory measurements of physical properties *in situ* behavior and engineering design.

The discussion at the Symposium indicated that there are fruitful differences of opinion which exist in certain areas. In most phases of engineering rock mechanics, it is becoming more apparent that the most meaningful tests on rocks are those which are performed *in situ.* Hence,

the analysis of techniques for purposes of standardization, in conjunction with research, development, and application, will materially augment the accuracy of the solution of many engineering mechanics problems.

G. B. Clark
Director, Rock Mechanics and Explosives Research Center, University of Missouri-Rolla, Rolla, Mo. 65401; symposium chairman.