Orientation

As the physical and mechanical properties of crystals are structurally controlled, the orientation of a crystal with respect to its boundary conditions is critical. This is illustrated by examination of a list of strength data for different directions of loading of a number of different types of single crystals (Handin, 1966). In calcite, for example, the yield strength for crystals compressed parallel to the c axis (r $\{10\bar{1}1\}$ translation gliding favored) is much larger than that for compression normal to the c axis (e $\{01\bar{1}2\}$ twin gliding favored, Figures 4, 5, and 6). Moreover, under low confining pressure this contrast leads to deformation by fracture when the crystal is loaded parallel to the c axis whereas when loaded normal to the c axis the deformation is still by intragranular flow (Friedman, 1963). In addition, it is well known that the values of the elastic moduli, thermal conductivities and expansions, electrical properties, etc., vary with crystallographic direction (Clark, 1966). It follows, therefore, that the physical and mechanical behavior of a rock is strongly dependent upon the nature and degree of any preferred crystallographic orientation of the constituent crystals (e.g., Albissin, 1966; Brace, 1965; among others).

ON THE SCALE OF THE ROCK

Our knowledge on the deformational behavior of rocks is extensive because most experiments are made with the intact or coherent rock specimen. One hesitates to assign dimensions to the size range under consideration here other than to assume that involved are aggregates of crystals or grains which form a continuous body bounded by nonpenetrative planes of mechanical discontinuity. In nature, then "rock" refers to the continuous body found between macrofractures or between bedding and foliation planes which separate materials of different lithology.