Lithology

The term lithology connotes not only gross rock type (e.g., sandstone, limestone, granite, basalt, etc.) but also the minor variations in mineralogy and texture that exist within rock types (e.g., calcite-cemented sandstone, siliceous limestone, anhydrite-rich rock salt, etc.). Handin (1966, p. 235) has compiled a comprehensive list of experimental data on the short-time mechanical properties of rocks. He finds upon study of 174 references that the measurements of different investigators are consistent, and that most specimens within a given lithologic category are found to behave similarly. These categories are listed below in order of decreasing ultimate strength and increasing ductility (Figure 7) as follows:

1) unfoliated igneous and metamorphic rocks, quartzite, highly silica-cemented sandstone,
2) slate and highly indurated siliceous shale,
3) dolomite,
4) moderately well cemented sandstone,
5) limestone,
6) schist, shale, mudstone, and poorly indurated siltstone,
7) salt and gypsum.

Thus it appears possible to discuss the gross influence of lithology without much regard for consideration of grain size, porosity, or texture, particularly for deformations at confining pressures in excess of 1000 bars.

This uniformity of behavior makes possible the prediction of the gross, relative, mechanical properties of any rock whether tested in the laboratory or not. This is particularly true when the relative ductilities or strengths are explicable on the basis of similar differences in mechanical behavior of the corresponding single crystals. For example, the differences