Clay, Shale, and Slag

By John R. Hill

What is the difference between clay and shale?
Shale is a form of sedimentary rock that is made up of clay-size particles of minerals that are rich in aluminum and silica. Clay particles are much smaller than sand and cannot be seen without the aid of very powerful magnifying devices such as the scanning electron microscope. When clay-rich sediments turn to rock, they become shale. Interestingly, some shales can be broken down upon crushing and wetting into the clay sediment from which they formed.

Special slurries of clay, water, and chemical additives create a plastic material that is easily molded into a variety of shapes. When heated to specified temperatures, the clay minerals present in the plastic clay are transformed into solids that include bricks, flower pots, drain tiles, and ceramics.

What is slag?
Slag comes from blast furnaces as a byproduct of steel manufacturing and from other industries where intense heat is used. Blast furnace slag is valued as a substitute raw material in the production of specialized cements in much the same way that calcined limestone serves in the manufacture of Portland cement (see the Cement handout). Where abundant and readily available, slag is an important aggregate raw material.