

14 Indian Pottery

electrolytes present, thoroughness with which it is mixed with water, length of time which the clay and water have been mixed and over the temperature of the mixture.

Water of Hydration Theory: The chemically combined water ($Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$) is responsible for the plasticity of clay because clay has its power to become plastic after it has been heated to a dull red heat. At the same temperature at which the chemically combined water is driven off.

Surface film Theory: The plasticity of clays is at least partly due to the extreme fineness of the clay grains.

Plate Theory: By examining some clays under a microscope they are found to be composed of a number of small plates. These plates are inclined to act as two pieces of glass when wet, and it is very easy to slip one plate over the other but almost impossible to pull them apart. This condition promotes plasticity.

Power of suspension: The power of suspension may be defined as the property of a substance which enables it to maintain itself and other materials in a state of suspension in a liquid.

This property is allied to their plasticity. Fine grained kaolin or ball clay will remain suspended in water for hours without signs of settling of grains. It is regulated into larger particles by the addition of flocculating electrolytes (acids, borax, magnesium sulphate etc.) They will settle more rapidly when the added electrolytes has a flocculating effect. The addition of flocculating electrolytes (Sodium Carbonate, Sodium Silicate) will break up the dispersion and produce a more permanent suspension.

Texture of clay: The plasticity, strength in the case of drying and shrinkage of a fired piece are greatly affected by the size and shape of the grains. This is called the texture of a clay. The more grinding a clay receives the finer its texture becomes.

Shrinkage: During drying the water is driven off. The water film on the surface of particles is gradually removed and the grains are permitted to draw together. After the water film is removed, water which is held in the pores of the spongy fine grained clay substance is driven off. The removal of this water and absorbed water results in shrinkage. The last traces of chemically combined water in clay can be removed by heating the clay to about the boiling point of water — $212^\circ F (100^\circ C)$.

Clays differ greatly in their shrinkage. The degree of variation in the drying shrinkage of clays is similar to the variation in the amount of water necessary to develop their plasticity. The greater the plasticity of the clay, greater will be the water absorbed and greater will be the thickness of the water film and hence greater will be the shrinkage.