The Coulomb Force between Two Charged Balls G.E. HITE, T.J. HYLAND, W.M. HAYMES, Texas A&M University-Galveston — It is common to demonstration Coulomb's law by using two charged balls. It is often stated that this demonstration verifies with good accuracy that the force varies inversely as the square of the distance between the balls centers, i.e. $1/R^2$. However, it has been known for over a hundred years that the force between two oppositely charged balls only varies in this manner when the separation between the balls is large compared to their diameters. In fact, the force actually diverges as the separation between the balls vanishes! It will be shown via the use of image charges that the force between oppositely charged balls can be approximated within 5rather simple and intuitive expression. An improved version of the pendulum experiment demonstrates that whereas the data vary by almost an order of magnitude form the inverse square behavior, there is good agreement with the theoretical prediction.

G.E. Hite
Texas A&M University-Galveston