Classical geometry is based on notions of symmetry and congruence, and these ideas, while very old, have deeply influenced our understanding of the physical world. The idea of modeling the world through principles of least action or least energy are tied to symmetry in deep ways. In this talk, I will survey the history of how this relationship was uncovered by mathematicians such as Euler, Gauss, Lie, and Noether and is still developing in our modern understanding of the world, from Einstein's theory of relativity even to contemporary versions of string theory.