

and fire it, the bullet is propelled with a certain energy that is determined by the weight of the ball and the velocity of its movement. In this case, however, the law holds good that action and reaction are equal. Every sportsman knows that when he fires his gun there is a recoil against his shoulder. Although in this case the action of the ball and the reaction or recoil of the gun are equal, it makes a great difference whether one places the muzzle or the butt of the gun against his shoulder.

The mechanical energy of recoil, however, is very slight as compared with that of the bullet when it leaves the muzzle of the gun. The former is mostly absorbed in overcoming the inertia of the gun, which is so much heavier than the bullet, and it passes directly into heat. If a gun could be made strong enough and still have no more weight than the bullet, it fires, it would be a dangerous gun to handle; for in this case the energy of the recoil would be equal to that of the bullet itself, and while the bullet might kill the game, the sportsman would be in an equally dangerous position.

In constructing a cannon provision must always be made for its recoil when fired. A cannon that fires a very heavy shot must itself be heavy, for two reasons: first, in order that it may be strong enough to resist the charge of powder, and, secondly, that it may be heavy