is well adapted to attract notice, since the curve described, which is transient and invisible in the case of a single projectile, becomes permanent and visible when we have a continuous stream. The doctrine of the motions of fluids has always been zealously cultivated by the Italians. Castelli's treatise, *Della Misura dell' Acque Corrente* (1638), is the first work on this subject, and Montucla with justice calls him "the creator of a new branch of hydraulics;"[3] although he mistakenly supposed the velocity of efflux to be as the depth of the orifice from the surface. Marsenne and Torricelli also pursued this subject, and after them, many others.

Galileo's belief in the near approximation of the curve described by a cannon-ball or musket-ball to the theoretical parabola, was somewhat too obsequiously adopted by succeeding practical writers on artillery. They underrated, as he had done, the effect of the resistance of the air, which is in fact so great as entirely to change the form and properties of the curve. Notwithstanding this, the parabolic theory was employed, as in Anderson's *Art of Gunnery* (1674); and Blondel, in his *Art de jeter les Bombes* (1683), not only calculated Tables on this supposition, but attempted to answer the objections which had been made respecting the form of the curve described. It was not till a later period (1740), when Robins made a series of careful and sagacious experiments on artillery, and when some of the most eminent mathematicians calculated the curve, taking into account the resistance, that the Theory of Projectiles could be said to be verified in fact.

The Third Law of Motion was still in some confusion when Galileo died, as we have seen. The next great step made in the school of Galileo was the determination of the Laws of the motions of bodies in their Direct Impact, so far as this impact affects the motion of translation. The difficulties of the problem of Percussion arose, in part, from the heterogeneous nature of Pressure (of a body at rest), and Momentum (of a body in motion); and, in part, from mixing together the effects of percussion on the parts of a body, as, for instance, cutting, bruising, and breaking, with its effect in moving the whole.

The former difficulty had been seen with some clearness by Galileo himself. In a posthumous addition to his *Mechanical Dialogues*, he says, "There are two kinds of resistance in a movable body, one internal, as when we say it is more difficult to lift a weight of a thousand pounds than a weight of a hundred; another respecting space, as

[3] Mont. ii. 201.