in his works, and in those of his scholars and successors. The motion of bodies falling freely was, however, in such treatises, generally combined with the motion of bodies Falling along Inclined Planes; a part of the theory of which we have still to speak.

The Notion of Accelerating Force and of its operation, once formed, was naturally applied in other cases than that of bodies falling freely. The different velocities with which heavy and light bodies fall were explained by the different resistance of the air, which diminishes the accelerating force;[9] and it was boldly asserted, that in a vacuum a lock of wool and a piece of lead would fall equally quickly. It was also maintained[10] that any falling body, however large and heavy, would always have its velocity in some degree diminished by the air in which it falls, and would at last be reduced to a state of uniform motion, as soon as the resistance upwards became equal to the accelerating force downwards. Though the law of progress of a body to this limiting velocity was not made out till the *Principia* of Newton appeared, the views on which Galileo made this assertion are perfectly sound, and show that he had clearly conceived the nature and operation of accelerating and retarding force.

When Uniform Accelerating Forces had once been mastered, there remained only mathematical difficulties in the treatment of Variable Forces. A Variable Force was measured by the *Limit* of the increment of the Velocity, compared with the increment of the Time; just as a Variable Velocity was measured by the Limit of the increment of the Space compared with that of the Time.

With this introduction of the Notion of Limits, we are, of course, led to the Higher Geometry, either in its geometrical or its analytical form. The general laws of bodies falling by the action of any Variable Forces were given by Newton in the Seventh Section of the *Principia*. The subject is there, according to Newton's preference of geometrical methods, treated by means of the Quadrature of Curves; the Doctrine of Limits being exhibited in a peculiar manner in the First Section of the work, in order to prepare the way for such applications of it. Leibnitz, the Bernouillis, Euler, and since their time, many other mathematicians, have treated such questions by means of the analytical method of limits, the Differential Calculus. The Rectilinear Motion of bodies acted upon by variable forces is, of course, a simpler problem than their Curvilinear Motion, to which we have now to proceed. But it

[9] Galileo, iii. 43.

[10] iii. 54.