

Still men's minds wanted confirmation in this view ; and they found such confirmation, when, in 1647, Pascal showed practically, that if we alter the length of the superincumbent column of air by going to a high place, we alter the weight which it will support. This celebrated experiment was made by Pascal himself on a church-steeple in Paris, the column of mercury in the Torricellian tube being used to compare the weights of the air ; but he wrote to his brother-in-law, who lived near the high mountain of Puy de Dôme in Auvergne, to request him to make the experiment there, where the result would be more decisive. "You see," he says, "that if it happens that the height of the mercury at the top of the hill be less than at the bottom (which I have many reasons to believe, though all those who have thought about it are of a different opinion), it will follow that the weight and pressure of the air are the sole cause of this suspension, and not the horror of a vacuum : since it is very certain that there is more air to weigh on it at the bottom than at the top ; while we cannot say that nature abhors a vacuum at the foot of a mountain more than on its summit."—M. Perrier, Pascal's correspondent, made the observation as he had desired, and found a difference of three inches of mercury, "which," he says, "ravished us with admiration and astonishment."

When the least obvious case of the operation of the pressure and weight of fluids had thus been made out, there were no further difficulties in the progress of the theory of Hydrostatics. When mathematicians began to consider more general cases than those of the action of gravity, there arose differences in the way of stating the appropriate principles : but none of these differences imply any different conception of the fundamental nature of fluid equilibrium.

Sect. 2.—Discovery of the Laws of Motion of Fluids.

THE art of conducting water in pipes, and of directing its motion for various purposes, is very old. When treated systematically, it has been termed *Hydraulics* : but *Hydrodynamics* is the general name of the science of the laws of the motions of fluids, under those or other circumstances. The Art is as old as the commencement of civilization : the Science does not ascend higher than the time of Newton, though attempts on such subjects were made by Galileo and his scholars.

When a fluid spouts from an orifice in a vessel, Castelli saw that the velocity of efflux depends on the depth of the orifice below the