parts remain immovable, as if they were frozen; in this way he finds a result agreeing with Torricelli's experiments on the velocity of the efflux.

We must allow that the assumptions by which this result is obtained are somewhat arbitrary; and those which Newton introduces in attempting to connect the problem of issuing fluids with that of the resistance to a body moving in a fluid, are no less so. But even up to the present time, mathematicians have not been able to reduce problems concerning the motions of fluids to mathematical principles and calculations, without introducing some steps of this arbitrary kind. And one of the uses of experiments on this subject is, to suggest those hypotheses which may enable us, in the manner most consonant with the true state of things, to reduce the motions of fluids to those general laws of mechanics, to which we know they must be subject.

Hence the science of the Motion of Fluids, unlike all the other primary departments of Mechanics, is a subject on which we still need experiments, to point out the fundamental principles. Many such experiments have been made, with a view either to compare the results of deduction and observation, or, when this comparison failed, to obtain purely empirical rules. In this way the resistance of fluids, and the motion of water in pipes, canals, and rivers, has been treated. Italy has possessed, from early times, a large body of such writers. The earlier works of this kind have been collected in sixteen quarto volumes. Lecchi and Michelotti about 1765, Bidone more recently, have pursued these inquiries. Bossut, Buat, Hachette, in France, have labored at the same task, as have Coulomb and Prony, Girard and Poncelet. Eytelwein's German treatise (*Hydraulik*), contains an account of what others and himself have done. Many of these trains of experiments, both in France and Italy, were made at the expense of governments, and on a very magnificent scale. In England less was done in this way during the last century, than in most other countries. The *Philosophical Transactions*, for instance, scarcely contain a single paper on this subject founded on experimental investigations.[4] Dr. Thomas Young, who was at the head of his countrymen in so many branches of science, was one of the first to call back attention to this: and Mr. Rennie and others have recently made valuable experiments. In many of the questions now spoken of, the accordance which engineers are able to obtain, between their calculated and observed results,

[4] Rennie, *Report to Brit. Assoc.*