

mathematically what is meant by a fluid. The chief property of a fluid, as compared with a solid body, is the perfect mobility of its parts, the absence of rigidity. Thus there were two possible kinds of fluids—those which retained their bulk or volume, whilst offering no resistance to change of shape, and those which tried to expand, and could be compressed by means of external forces. These latter were called gases. In dealing with the former, incompressibility had to be defined mathematically, as also perfect mobility. These properties constitute what is called a perfect fluid. Such perfect fluids do not exist in nature; but the method of reasoning was to begin with an ideal, simple case, and approach the explanation of natural phenomena by a process of correction, introducing more and more complications. The phenomena of the flow of liquids, practically by far the most important, could be studied to a great extent by means of the simplest form of the hydrodynamical conception, and up to the middle of the century such problems, as well as those of the propagation of small displacements under the action of external forces,—notably the motion of waves,—formed the principal problems which were treated mathematically. The idea of the friction of fluids, also called viscosity, had been excluded in the definition of a fluid, inasmuch as friction opposed the notion of perfect mobility of the parts, which was the mathematical definition of a fluid. Now it is a matter of experience that in all liquids with which we are acquainted friction can produce rotational motion, such as whirls and eddies; it was also found that other forces, such as magnetic forces, are, under certain con-