engaged. The solution of the latter problem involved experiment as well as calculation. The different states and properties of matter had to be studied from quite novel points of view: they had to be defined in terms of the different kinds of motion and of inertia, *i.e.*, resistance to motion or capacity for motion. The popular conceptions of solidity, rigidity, fluidity, expansion, pressure, weight, required to be translated into the language of ordinary dynamics, that it might appear to what

vocabulary of physical optics. He has, however, whilst working independently, been careful to point out to what extent his views agree with or are anticipated by the important writings of Cauchy and Poisson in France. Up to his time the ether was universally spoken of as a fluid. Stokes led up to the "elastic solid" and the "jelly" theory of the ether. "Undoubtedly," he says, "it does violence to the ideas that we should have been likely to form *a priori* of the nature of the ether to assert that it must be regarded as an elastic solid in treating of the vibrations of light. When, however, we consider . . . the difficulty of explaining these phenomena by any vibrations due to the condensation and rarefaction of an elastic fluid such as air, it seems reasonable to suspend our judgment and be content to learn from phenomena the existence of forces which we should not beforehand have expected. . . . The following illustration is advanced, not so much as explaining the real nature of the ether, as for the sake of offering a plausible mode of conceiving how the apparently opposite properties of solidity and fluidity which we must attribute to the ether may be reconciled. Suppose a small quantity of glue dissolved in a little water so as to form a stiff jelly. This jelly forms, in fact, an elastic solid: it may be constrained . . . and return to its original form when the constraining force is removed, by virtue of its elasticity; but if we constrain it too far it will break. Suppose now the quantity of water to be 'increased' . . . till we have a pint or a quart of glue-water. The jelly will then become thinner. . . . At last it will become so far fluid as to mend itself again as soon as it is dislocated. Yet there seems hardly sufficient reason for supposing that at a certain stage of the dilution the tangential force whereby it resists constraint ceases all of a sudden. In order that the medium . . . should have to be treated as an elastic solid, it is only necessary that the amount of constraint should be very small. The medium would, however, be what we should call a fluid as regards the motion of solid bodies through it. . . . Conceive now a medium having similar properties, but incomparably rarer than air, and we have a medium such as we may conceive the ether to be, a fluid as regards the motion of the earth and planets through it, an elastic solid as regards the small vibrations which constitute light" ('Papers,' vol. ii. p. 11 *sqq.*)