

absence of those distinct ideas of force and mechanical pressure, on which our perception of the identity or difference of different modes of action must depend;—of those ideas by the help of which Archimedes had been able to demonstrate the properties of the lever, and Stevinus afterwards discovered the true solution of the problem of the inclined plane. The motive to Pappus's assumption was probably no more than this;—he perceived that the additional power, which he thus obtained, vanished when the plane became horizontal, and increased as the inclination became greater. Thus his views were vague; he had no clear conception of mechanical action, and he tried a geometrical conjecture. This is not the way to real knowledge.

Pappus (who lived about A. D. 400) was one of the best mathematicians of the Alexandrian school; and, on subjects where his ideas were so indistinct, it is not likely that any much clearer were to be found in the minds of his contemporaries. Accordingly, on all subjects of speculative mechanics, there appears to have been an entire confusion and obscurity of thought till modern times. Men's minds were busy in endeavoring to systematize the distinctions and subtleties of the Aristotelian school, concerning Motion and Power; and, being thus employed among doctrines in which there was involved no definite meaning capable of real exemplification, they, of course, could not acquire sound physical knowledge. We have already seen that the physical opinions of Aristotle, even as they came from him, had no proper scientific precision. His followers, in their endeavors to perfect and develop his statements, never attempted to introduce clearer ideas than those of their master; and as they never referred, in any steady manner, to facts, the vagueness of their notions was not corrected by any collision with observation. The physical doctrines which they extracted from Aristotle were, in the course of time, built up into a regular system; and though these doctrines could not be followed into a practical application without introducing distinctions and changes, such as deprived the terms of all steady signification, the dogmas continued to be repeated, till the world was persuaded that they were self-evident; and when, at a later period, experimental philosophers, such as Galileo and Boyle, ventured to contradict these current maxims, their new principles sounded in men's ears as strange as they now sound familiar. Thus Boyle promulgated his opinions on the mechanics of fluids, as "Hydrostatical *Paradoxes*, proved and illustrated by experiments." And the opinions which he there opposes, are those which the Aristotelian philosophers habitually propounded as certain