

look upon a comet as something very interesting, of which the sight affords us a pleasure unmingled with fear of war, pestilence, or other calamity, and of which we therefore wish the return, is a gain we cannot measure by money. In all ages astronomy has been an index to the civilization of the people who cultivated it. It has been crude or exact, enlightened or mingled with superstition, according to the current mode of thought. When once men understand the relation of the planet on which they dwell to the universe at large, superstition is doomed to speedy extinction. This alone is an object worth more than money.

Astronomy may fairly claim to be that science which transcends all others in its demands upon the practical application of our reasoning powers. Look at the stars that stud the heavens on a clear evening. What more hopeless problem to one confined to earth than that of determining their varying distances, their motions, and their physical constitution? Everything on earth we can handle and investigate. But how investigate that which is ever beyond our reach, on which we can never make an experiment? On certain occasions we see the Moon pass in front of the Sun and hide it from our eyes. To an observer a few miles away the Sun was not entirely hidden, for the shadow of the Moon in a total eclipse is rarely one hundred miles wide. On another continent no eclipse at all may have been visible. Who shall take a map of the world and mark upon it the line on which the Moon's shadow will travel during some eclipse a hundred years hence? Who shall map out the orbits of the heavenly bodies as they are going to appear in a hundred thousand years? How shall we ever know of what chemical elements the Sun and the stars are made? All this has been done, but not by the intellect of any one man. The road to the stars has been opened only by the efforts of many generations of mathematicians and observers, each of whom began where his predecessor had left off. We have reached a certain stage where we know much about the heavenly bodies.

We have mapped out our solar system with great precision. But how with that great universe of millions of stars in which