and mirrors, of which traces appear in Greek and Roman writers (*c*), there had been even the first Galilean or the smallest Newtonian telescope in the hands of Hipparchus, Eratosthenes, or Ptolemy, would it have been left to their remote successors to be still struggling with the elements of physical astronomy, and waiting with impatience till another quarter of a century shall have rolled away, and given us one more good chance of measuring the distance of the sun by the transit of Venus? Had such instruments as Wheatstone's chronoscope been invented, would it have been left to Foucault to condense into his own apartment an experimental proof of the velocity of light, and within a tract of thirty feet to determine the rate of its movement through all the vast planetary space of millions and thousands of millions of miles, more exactly than had been inferred by astronomers from observations of the satellites of Jupiter (*d*)? By this experiment the velocity of light appears to be less—sensibly less—than was previously admitted; and this conclusion is of the highest interest. For, as by assuming too long a radius for the orbit of Jupiter the calculated rate of light-movement was too great; so now, by employing the more exact rate and the same measures of time, we can correct the estimated distance of Jupiter and all the other planets from the sun. We have, in fact, a really independent measure of planetary space; and it concurs with observations of the parallax of Mars, in requiring a considerable reduction of the assumed diameters of the planetary paths. The distance of the earth from the sun must be reduced from above ninety-five to less than ninety-three millions of miles, and by this scale the other space measures of the solar

(*c*) The effect of lenses or globes of glass or crystal (ὕαλος) in collecting the solar rays to a point, are familiarly referred to by Aristophanes in the Nubes, 766; and the ornamental use of convex and concave reflectors is known by the curious discussions in the Fourth Book of Lucretius.

(*d*) Fizeau performed experiments on the velocity of light between Suresnes and the Butte Montmartre, by means of the oxyhydrogen light, reflected back in its own path. The space was 28,324ft. Engl. Twice this distance was traversed in $\frac{1}{18{,}000}$ of a second=167,528 geogr. miles in a second. From observations of Jupiter's satellites, Delambre inferred 167,976 miles, Struve 166,096. The experiment of M. Foucault gives 298,000,000 metres=160,920 geogr. miles.