MED is necessarily exaggerated. But on account of the earth's attraction the moon describes the curve MC, and therefore in one second the moon is at C and not at D. The problem is to measure the distance CD, which represents the pull of the earth on the moon in one second of time, or in other words the distance that the moon falls to the earth in one second of time.

The moon in one second describes an angle

$$\frac{360^\circ}{27\tfrac{1}{3} \times 24 \times 60 \times 60} = \omega = \text{about } 0''\cdot 5.$$

The angle MED is ω. During this time the approach to the earth $= 60 \times 4000 \times 5280 \times \text{vers. } \omega$ foot,

$$= \frac{60 \times 4000 \times 5280 \times 2\pi^2}{(27\tfrac{1}{3} \times 24 \times 60 \times 60)^2},$$

$$= \frac{3 \times 3 \times 60 \times 4000 \times 5280 \times 2 \times 22 \times 22}{82 \times 82 \times 24 \times 24 \times 60 \times 60 \times 60 \times 60 \times 7 \times 7},$$

which, on cancelling out common factors,

$$= \frac{55 \times 11 \times 11}{7 \times 7 \times 41 \times 41 \times 18} = \frac{6655}{1482642} = \cdot 00447 \text{ ft.}$$

which is the same result obtained before.

It is to be noted that Newton in 1665 attempted this calculation but the result did not agree with the observed force of gravity on the earth, and so he gave the problem up, and doubted the universal applicability of the law of the inverse square of the distance, and so continued his brooding. He had been, however, proceeding upon erroneous data of the earth's diameter, and nineteen years thereafter, being 1684, having been supplied with a more accurate measurement of the earth's diameter by Picard, he looked up his old papers and made fresh calculations. As they drew to a close he observed that the figures were shaping themselves to prove the truth of his theory, and it is recorded that he became so agitated that he asked a friend to finish the calculation.

His great work consists of three books. The first and second, which occupy three quarters of the work, are entitled