and in Vellum manuscript had rejected Galileo's value of the fall in 1 second (roughly 5 ft), and then proposed a 45 degree conical pendulum as a means for measuring the correct value

    c.   Here he does mention the conical pendulum at the end, but he does not follow up the mention with a full mechanical theory in the way Huygens does

6.   Nor does Newton derive any easily testable results, like Huygens's result for the intercepted pendulum, for he is pursuing different objectives

    a.   That is, he is working outside the tradition of Galileo's *Two New Sciences*

    b.   And he is being provoked by astronomical concerns

B.   Four Immediate Applications of the Theory

1.   Newton proceeds to derive one primary result about the centrifugal tendency at the surface of the Earth from the basic theoretical result, and then draws conclusions on three other topics

    a.   With the exception of the acceleration of gravity, Newton is largely using values taken from Galileo's *Dialogue*

    b.   (Interesting that he would reject Galileo's value for the acceleration of gravity and accept other values from the book)

2.   Compare the centrifugal tendency at the surface of the earth to gravity, in the process confirming Galileo's explanation for why we do not feel the centrifugal tendency, much less fall off the earth

    a.   Assume radius of earth = 3500 (Italian) miles, 5000 ft per mile

    b.   Then since acceleration of gravity is 32 ft/sec/sec (corresponding roughly to Huygens's announced value), the force (*vis*) of gravity is 350 times stronger than the centrifugal *conatus* at the equator

    c.   The correct value -- using a correct radius of the earth instead of the value Newton has taken from Galileo's *Dialogue* -- is 288

3.   Compare the centrifugal tendency of the moon with that on the surface of the earth, in effect exploiting the fact that r/P^2 gives this proportionality

    a.   Moon 60 earth radii away, so that centrifugal tendency on the surface of the earth is 12.5 times stronger than that of the moon

    b.   Therefore, gravitational force at the surface of the earth is around 4000 (4375) times the centrifugal tendency of the moon -- versus 3600 times if $1/r^2$

4.   Infer (incorrectly) a lower bound of the horizontal solar parallax (19 sec) from the assumption that the centrifugal tendency of the moon is responsible for our always seeing the same face

    a.   For then the centrifugal tendency of the moon with respect to the earth would have to be greater than that of the moon with respect to the sun, for otherwise the moon would always show the same face to the sun, and not to the earth

    b.   Therefore centrifugal *conatus* on surface of earth 132,408 times greater than centrifugal *conatus* with respect to the sun (assuming -- incorrectly -- that horizontal solar parallax is 24 sec)