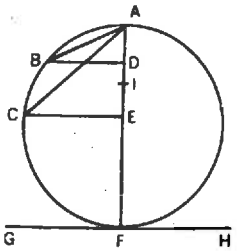
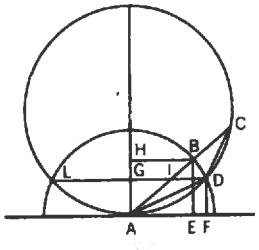
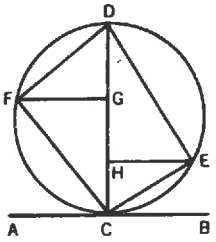
A Further Example of a Striking Result

Prop. VI. ***If, from the highest or lowest point of a vertical circle, any inclined planes whatever are drawn to its circumference, the times of descent along these planes will be equal.***





Corol. I. ***From this it is deduced that the times of descent from all chords drawn from the terminals C and D are equal to one another.***



Corol. II. ***It is also deduced that if from the same points there descend a vertical and an inclined plane, over which descents are made in equal times, they are [inscribable] in a semicircle of which the diameter is vertical.***

The Structure of "Day 3"

Propositions I – III: ***fundamental results***

Propositions IV – IX: ***comparisons involving inclined planes***

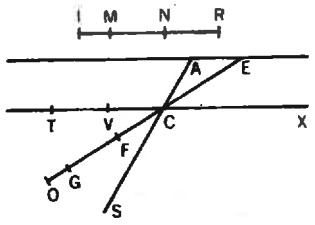
Propositions X – XXVI: ***initial speeds and diverting motion from one plane to another, culminating in the Scholium to Prop.*** **XXIII**

Propositions XXVII –XXXI: ***minimum time trajectories***

Propositions XXXII – XXXVII: ***time comparisons along different paths, culminating in the Scholium to Prop.*** **XXXVI**

21 theorems, 16 problems, where latter require solving for an unknown quantity (geometric magnitude), given other quantities, using purely geometrical methods (compass and rules)

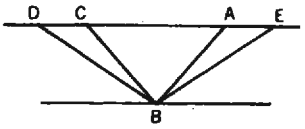
Scholium to Prop. XXIII



And we may then deduce that if, in the above diagram, after descent through the inclined plane AC, there is diversion along a horizontal line such as CT, the space through which the moveable will next be moved, in a time equal to that of descent through AC, would be exactly double the space AC....

It may also be noted that whatever degree of speed is found in the moveable, this is by its nature indelibly impressed on it when external causes of acceleration or retardation are removed, which occurs only on the horizontal plane; for on declining planes there is a cause of more acceleration, and on rising planes, of retardation. From this it likewise follows that motion in the horizontal is also eternal, since if it is indeed equable it is not weakened or remitted, much less removed.

Scholium to Prop. XXIII



From this we may therefore reasonably assert that if descent is made through some inclined plane, after which there follows reflection through some rising plane, the moveable ascends, by the impetus received, all the way to the same altitude or height from the horizontal. Thus if the descent is along AB, the moveable is carried along the diverted plane BC to the horizontal ACD; and not only if the inclinations of the planes are equal, but also if they are unequal, as is plane BD. For it was assumed earlier that the degrees of speed acquired over unequally inclined planes are equal whenever the planes are of the same height above the horizontal. But if the same inclination exists for planes EB and BD, descent through EB suffices to impel the moveable along plane BD all the way to D, as such an impulse is made on account of the received impetus of speed at point B; and there is the same impetus at B whether the moveable descends through AB or through EB. It follows that the moveable is pushed out likewise along BD after descent along AB or along EB.