Descartes on Galileo, 11 Oct. 1638

I shall commence this letter by my observations about Galileo's book. I find generally that he philosophizes much better than ordinary, in that he avoids as best he can the errors of the scholastics, and undertakes to examine physical matters by mathematical reasonings. In this I accord with him entirely and I hold that there is no better way to find the truth. But he seems to me very faulty in continually making digressions and never stopping to explain [*explicandae*] completely any matter, which shows that he has not examined things in order, and that without having considered the first causes of nature he has only sought the reasons of some particular effects, and thus he built without foundation [*fundamento*].

Descartes on Days One and Two

p. 88. His experiment to know if light is transmitted in an instant is useless, since eclipses of the moon, related so closely to calculations made of them, prove this incomparably better than anything that could be tested on earth.

p. 113. He says rightly that bodies descend more unequally fast in water than in air, but he says nothing at all about the cause, and he is wrong (p. 114) in saying that water does not at all resist being divided.

p. 116-17. Everything he says about the speeds of bodies descending in the void etc. is built without foundation [*nullo fundamento*], for first he should have determined what weight [*gravitas*] is, and if he had known the truth, he would have known that it is nothing in the void.

Descartes on Day Three

pp. 197-8. He supposes that the speeds in falling weights always increase equally, which I formerly believed like him, but I now believe I can prove that it is not true.

p. 205. He supposes also that the degrees of speed of the same body over different planes are equal when the elevations are equal, which he does not prove and is not exactly true, and since everything that ensues depends on those two assumptions, one can say it is entirely built in the air. For the rest, he seems not to have written his third dialogue except to give a reason why all descents and returns of the same cord [of a pendulum, through different arcs of a circle] are equal to one another, and yet he does not do this, but concludes only that weights descend faster along the arc of a circle than along the chord of the same arc, which also he has been unable to deduce exactly from his assumptions.

Descartes on Day Four

p. 268. He adds another assumption to the preceding [two], which is no more true; namely, that bodies thrown in air go uniformly fast along the horizontal, but that in falling their speeds increase in the squared ratio [sic] of the distance. Now, given this, it is very easy to conclude that the movement of bodies thrown ought to follow a parabolic line; but his hypotheses being false, his conclusion can well be very far from the truth.

p. 296. It is to be noted that he takes the converse of his proposition without proving or explaining it, that is, if the shot fired horizontally from B toward E follows the parabola BD, the shot fired obliquely following the line DE must follow the same parabola DB, which indeed follows from his assumptions. But he seems not to have dared to explain these from fear their falsity would be too evident. Yet he makes use only of this converse in all the rest of his fourth discourse, which he seems to have written only to explain the force of cannon shots fired at different elevations. Moreover, it is to be noted that in setting forth his assumptions he excludes artillery in order to make them more easily accepted, and yet toward the end it is mainly to artillery that he applies his conclusion. This is to say, in a word, that all is built in the air.

Descartes on Fermat on Galileo

... What Galileo says that falling bodies pass through all
degrees of speed, I do not at all think that happens ordi-
narily, though it is not impossible that it sometimes
happens. And there is error in the argument used by M.
F[ermat] to refute this, in that he says that "speed is to be
acquired either in the first instant or in some determined
time;" for neither the one nor the other is true.... In sum
everything that he says about degrees of speed of move-
ment can be said in the same way about degrees of length
of triangle ABC, and yet I do not believe that he wants to
deny that between point A and line BC there are not all the
lengths that are less than BC.

And for refutation of Galileo's opinion concerning move-
ments on inclined planes, M. F[ermat] is mistaken in that
he founds his argument on tendency of weights toward the
center of earth, which he imagines as a point, and Galileo
assumes that they descend along parallel lines.