

ASSIGNMENT 2

Philosophy 167

due November 4, 2014

Just as the elliptical orbit "law" is attributed to Kepler, the laws of free fall and parabolic trajectory are attributed to Galileo, and the law of inertia is attributed, often with qualifications, to Descartes (and sometimes Galileo). Newton remarked that Kepler merely guessed that the orbits were elliptical. Historians of science have pointed out that much the same could have been said of Galileo and Descartes. For, just as in the case of Kepler, the reasons Galileo and Descartes offered in support of the laws attributed to them included a large conjectural element. Furthermore, Galileo and Descartes put these laws forward in the context of conceptual frameworks significantly at variance with that of classical dynamics, the framework in which the three laws became cornerstones of modern science. Hence, one can even argue that what Galileo and Descartes meant by their laws differed significantly from what these laws came to mean in modern science.

The degree to which Galileo and Descartes merely guessed in discovering the laws attributed to them is somewhat beside the point for our purposes. A more important question concerns the evidence that the "scientific community" had bearing on each of these laws a decade or so after publication of Two New Sciences (1638) and Principles of Philosophy (1644). On this score these laws contrast sharply with Kepler's elliptical orbit "law." By the mid-1650's Kepler's law was known to agree with observational data virtually to within observational accuracy. Surely, however, no such claim could have been made about the laws of free fall, parabolic trajectory, and inertia. For, each of these laws concern what happens in the absence of a resisting medium, yet all available data included at least some resistance effects.

1651, a year after Descartes died and the year of Riccioli's New Almagest and Huygens's first published work, is a convenient point of reference for us. Your task is to write a 5 to 7 page paper *comparing* the evidence available as of 1651 for the law of free fall, the law of parabolic trajectory, and the law of inertia, respectively. In reviewing the weight of this evidence, you should give some thought to such things as what it showed about the range over which each law holds, *ceteris paribus* conditions, whether the law holds only approximately, and whether it is truly lawlike and not a mere artifact. You are not being asked to assess the strengths and deficiencies of the evidence on any absolute scale, for there is no salient absolute scale to use. But, if you find it will make your task easier, you can use the evidence available in 1651 for Kepler's elliptical orbit "law" as a reference and assess the comparative strengths and deficiencies of the evidence for each of the other three laws relative to it.