accordance of the distances, libration in the diameter of the epicycle was attributed, should, according to the indication of the equations, go in an elliptical path. What an absurdity on my part! as if libration in the diameter might not be a way to the ellipse!"

Another scruple respecting this theory arose from the impossibility of solving, by any geometrical construction, the problem to which Kepler was thus led, namely, "To divide the area of a semicircle in a given ratio, by a line drawn from any point of the diameter." This is still termed "Kepler's Problem," and is, in fact, incapable of exact geometrical solution. As, however, the calculation can be performed, and, indeed, was performed by Kepler himself, with a sufficient degree of accuracy to show that the elliptical hypothesis is true, the insolubility of this problem is a mere mathematical difficulty in the deductive process, to which Kepler's induction gave rise.

Of Kepler's physical reasonings we shall speak more at length on another occasion. His numerous and fanciful hypotheses had discharged their office, when they had suggested to him his many lines of laborious calculation, and encouraged him under the exertions and disappointments to which these led. The result of this work was the formal laws of the motion of Mars, established by a clear induction, since they represented, with sufficient accuracy, the best observations. And we may allow that Kepler was entitled to the praise which he claims in the motto on his first leaf. Ramus had said that if any one would construct an astronomy without hypothesis, he would be ready to resign to him his professorship in the University of Paris. Kepler quotes this passage, and adds, "it is well, Ramus, that you have run from this pledge, by quitting life and your professorship;[14] if you held it still, I should, with justice, claim it." This was not saying too much, since he had entirely overturned the hypothesis of eccentrics and epicycles, and had obtained a theory which was a mere representation of the motions and distances as they were observed.

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[14] Ramus perished in the Massacre of St. Bartholomew.