http://www.geology.19thcenturyscience.org/books/1858-Whewell-HistSci/README.htm

CHAPTER II.

Induction of Copernicus.—The Heliocentric Theory asserted on formal grounds.

IT will be recollected that the *formal* are opposed to the *physical* grounds of a theory; the former term indicating that it gives a satisfactory account of the relations of the phenomena in Space and Time, that is, of the Motions themselves; while the latter expression implies further that we include in our explanation the Causes of the motions, the laws of Force and Matter. The strongest of the considerations by which Copernicus was led to invent and adopt his system of the universe were of the former kind. He was dissatisfied, he says, in his Preface addressed to the Pope, with the want of symmetry in the Eccentric Theory, as it prevailed in his days; and weary of the uncertainty of the mathematical traditions. He then sought through all the works of philosophers, whether any had held opinions concerning the motions of the world, different from those received in the established mathematical schools. He found, in ancient authors, accounts of Philolaus and others, who had asserted the motion of the earth. "Then," he adds, "I, too, began to meditate concerning the motion of the earth; and though it appeared an absurd opinion, yet since I knew that, in previous times, others had been allowed the privilege of feigning what circles they chose, in order to explain the phenomena, I conceived that I also might take the liberty of trying whether, on the supposition of the earth's motion, it was possible to find better explanations than the ancient ones, of the revolutions of the celestial orbs.

"Having then assumed the motions of the earth, which are hereafter explained, by laborious and long observation I at length found, that if the motions of the other planets be compared with the revolution of the earth, not only their phenomena follow from the suppositions, but also that the several orbs, and the whole system, are so connected in order and magnitude, that no one part can be transposed without disturbing the rest, and introducing confusion into the whole universe."

Thus the satisfactory explanation of the apparent motions of the planets, and the simplicity and symmetry of the system, were the