

the *Almagest*. As he, like the Arabs, always calls Hipparchus *Abraxis*, we may conclude that he also made use of only a Latin translation from the Arabic. Next to Bacon's chemical experiments on combustible explosive mixtures, his theoretical optical works on perspective, and the position of the focus in concave mirrors, are the most important. His profound *Opus Majus* contains proposals and schemes of practicable execution, but no clear traces of successful optical discoveries. Profoundness of mathematical knowledge can not be ascribed to him. That which characterizes him is rather a certain liveliness of fancy, which, owing to the impression excited by so many unexplained great natural phenomena, and the long and anxious search for the solution of mysterious problems, was often excited to a degree of morbid excess in those monks of the Middle Ages who devoted themselves to the study of natural philosophy.

Before the invention of printing, the expense of copyists rendered it difficult, in the Middle Ages, to collect any large number of separate manuscripts, and thus tended to produce a great predilection for encyclopedic works after the extension of ideas in the thirteenth century. These merit special consideration, because they led to a generalization of ideas. There appeared the twenty books *De Rerum Natura* of Thomas Cantipratensis, Professor at Louvain (1230); The Mirror of Nature (*Speculum Naturale*), written by Vincenzius of Beauvais (Bellovacensis) for St. Louis and his consort Margaret of Provence (1250); The Book of Nature, by Conrad von Meygenberg, a priest at Ratisbon (1349); and the Picture of the World (*Imago Mundi*) of Cardinal Petrus de Alliaco, bishop of Cambrai (1410), each work being in a great measure based upon the preceding ones. These encyclopedic compilations were the forerunners of the great work of Father Reisch, the *Margarita Philosophica*, the first edition of which appeared in 1486, and which for half a century operated in a remarkable manner on the diffusion of knowledge. I must here pause for a moment to consider the "Picture of the World" of Cardinal Alliaco (Pierre d'Ailly). I have elsewhere shown that the work entitled "Imago Mundi" exercised a greater influence on the discovery of America than did the correspondence with the learned Florentine Toscanelli.\* All that Columbus knew of Greek and Roman writers,

\* See my *Examen Crit.*, t. i., p. 61, 64-70, 96-108; t. ii., p. 349. "There are five memoirs *De Concordantia Astronomia cum Theologia*, by Pierre d'Ailly, whom Don Fernando Colon always calls Pedro de